Service Manual

CHRISTINI AWD 450DS

Christini Technologies, Inc.
tech@christini.com

Version 2015.1

Congratulations for making the choice to become and AWD rider!

The instructions in this book will provide a simple and understandable guide to your motorcycle's operation and maintenance.

Whenever you see the symbols shown below, heed their instructions!

WARNING
This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.

CAUTION
This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

NOTE
This note symbol indicates points of particular interest for more efficient and convenient operation.

Always follow safe operating and maintenance practices.

If improperly conducted, the sport has the potential to cause environmental problems as well as conflicts with other people. Responsible use of your motorcycle will ensure that these problems and conflicts do not occur.

TO PROTECT THE FUTURE OF YOUR SPORT, MAKE SURE YOU USE YOUR BIKE LEGALLY, SHOW CONCERN FOR THE ENVIRONMENT, AND RESPECT THE RIGHTS OF OTHER PEOPLE.

This manual should be considered a permanent part of the motorcycle and should remain with the motorcycle when resold or otherwise transferred to a new owner or operator.

We reserve the right to amend this motorcycle service manual due to periodic improvements and upgrades.

Table of Contents

General Bike Service

General Information	5
General Specifications	5
Lubricant System Specifications	7
Cooling System Specifications	7
Tire Specifications	8
Battery Specifications	8
Spark Plug Specifications	8
Basic Operating Instructions	9
Precaution	9
Pre-Ride Inspection	10
Starting/Stopping Engine	11
Break-In	12
Maintenance	13
General Service Information	13
Maintenance Schedule	13
Service Information	16
Wiring Diagram	33

AWD Service

Required tools	35
AWD detailed illustration	36
Routine maintenance schedule	38
AWD clutch test	39
AWD sprag test	40
AWD chain removal	41
AWD engagement switch	45
Front wheel removal	50
Front wheel service	52
Fork removal and installation	59
Dropout service	61
Fork spline bearing service	70
Boot Replacement	75
Triple clamp removal	77
Triple clamp service	79
Main drive shaft removal	94
Head tube bearing service	95
Main drive shaft installation	97
Triple Clamp Installation	98
Gearbox removal	102
Gearbox service	103
AWD clutch removal	108
AWD clutch Service	109
Troubleshooting	113
Warranty	114

General Specifications

ITEM		TECHNICAL DATA		
		OFFROAD	DUAL SPORT	MOTARD
DIMENSIONS	OVERALL LENGTH	2175mm		
	OVERALL WIDTH	810mm		
	OVERALL HEIGHT	1240mm		
	F/R WHELL AXIS DIS-TANCE	1505mm		
	SEAT HEIGHT	960mm		
	GROUND CLEARANCE	320mm		
	N.W	118kg	130kg	130kg
CHASSIS	FRAME TYPE	ALUMINIUM ALLOY TWIN-SPAR		
	FRONT TIRE SIZE	80/100-21	80/100-21	110/70-17
	REAR TIRE SIZE	110/90-19''	110/100-18	140/70-17
	FRONT SUSPENSION	INVERTED CARTRIDGE FORK WITH RE-BOUND COMPRESSION-DAMPING ADJUST		
	REAR SUSPENSION	MONOSHOCK WITH SPRING-PRELOAD, RE-BOUND AND COMPRESSION-DAMPING AD-JUST		
	FUEL TANK CAPACITY	8.0L WITH RESERVE VALVE		
ENGINE	TYPE	SINGLE CYLINDER, 4-STROKE, LIQUID COOLED		
	MAX POWER	32KW/7500RPM : 43.5HP/7500RPM		

General Specifications — Continued

RATED POWER		30.5KW/7000RPM
MAX TORQUE		42.5NM/6500RPM
IDLE SPEED		1700±150 RPM
FUEL CONSUMPTION		≤340 g/kW.h
BORE X STROKE		96×62.1 mm
DISPLACEMENT		449 ml
COMPRESSION RATIO		11:1
VALVE TRAIN		CHAIN DRIVE SOHC FOUR VALVE
LUBRICATION TYPE		PRESSURE SPRAY
LUBRICATION OIL TYPE		SAE 10W-40
IGNITION ADVANCE DEGREE		12° BTDC [3000RPM]
VALVE CLEARANCE(COOL)		INTAKE VALVE: 0.16±0.03 mm EXHAUST VALVE: 0.28±0.03 mm
DECOMPRESS CLEARANCE		EX VALVE CLEARANCE (0.28mm)+0.15mm=0.43mm
SPARK PLUG TYPE		DENSO IK24/IK27
DIMENSION		350mm×297mm×423 mm
DRIVE TYPE		CHAIN
DRIVE SPROCKET		13T
CLUTCH TYPE		MANUAL, MULTI-WET
TRANSMISSION TYPE		CONSTANT MESH, 5 SPEED, LEFT FOOT OPERATED
PRIMARY ADJUCTION RATIO		2.739(63/23)
GEAR RATIO	1ST	2.230(29/13);
	2ND	1.625(26/16)
	3RD	1.235(21/17)
	4TH	1.000(19/19)
	5TH	0.826(19/23)
IGNITION TYPE		DC/AC CDI
STARTER		KICK / ELECTRIC
STARTING CAPACITY		≤15 s

Lubrication System

ITEM		DATA
ENGINE OIL 870ml API SG or higher **SAE10W-40**	AT DRAINING	670 ml
	AT FILTER CHANGE	700ml
	AT DISASSEMBLY	870ml
TRANSMISSION OIL 950ml API SG or higher **SAE 10W-40**	AT DRAINING	850ml
	AT DISASSEMBLY	900ml (Approximately One Quart)

WARNING: *Low Oil level in Transmission can cause transmission failure.*

Warranty Void if transmission oil is not kept at mandatory level.

Failure to change transmission oil and oil filter on scheduled maintenance and at recommended level of 950ml can cause the transmission to lock and cause serious injury or death.

ITEM		DATA
COOLANT CAPACITY	AT CHANGE	1.11 liter
	DISASSEMBLY	1.20 liter
ANTIFREEZE		HIGH QUALITY ETHYLENE GLYCOL ANTIFREEZE CONTAINING SILICATE-FREE CORROSION IN-HIBITORS
STANDARDS COOLANT CONCENTRA-TION		1:1 MIXTURE WITH DISTILLED WATER

Tire Specifications

ITEM		STANDARDS	REPAIR LIMIT
COLD TIRE PRESSURE		33/2.3 (psi/bar)	
MAX LOAD	FRONT	430 / 195 (lbs/kgs)	
	REAR	548 / 265 (lbs/kgs)	

Battery Specifications

ITEM			DATA
BATTERY	CAPACITY		12V-6Ah
	CURRENT CONSUMPTION		MAX 0.1mA
	VOLTAGE(20^0/68^0F)	FULL	13.0-13.2V

Spark Plug Specifications

ITEM			DATA
SPARK PLUG	STANDARDS	DENSO	IK24
	OPTIONAL	NGK	IFR8H-11

PRECAUTION

For your safety, you must obey the following 9 rules while riding the motorcycle:

- Wear your helmet: Safe ride begins with putting on helmet. You must wear helmet while riding.

- Wear simple and convenient clothes. Pay attention to avoid wearing loose clothing. Please wear tight and closed clothes to ensure that your hands and feet move freely.

- Check the pre-ride inspection before riding: Always check before starting the engine.

- Get familiar with the assembly and performance of this motorcycle

-Your riding skills and knowledge of this motorcycle are the basis of safe riding. You should practice riding in an open area without vehicles to master riding skills.

- Get to know the speed limit of safe riding

-The motorcycle's safe riding speed depends on the ground condition and your riding skills. Knowing the speed limit based on your riding ability can avoid accidents.

- Do not ride after drinking or taking medicine.

- This bike is designed for adult operators only. Be sure you are allowed to ride this kind of motorcycle based on your local laws.

- Pay special attention to riding in rain

-Riding on wet roads is very dangerous. Turn during acceleration and a keep safe distance from vehicles in front of your motorcycle. Remember that the braking distance in rain is twice of that in sunny days, and please pay special attention to traffic signs. Once the condition of the road changes, reduce your speed.

-Exhaust gas contains harmful substance such as carbon monoxide. Only start the engine in well-ventilated places.

PRE-RIDE INSPECTION

Check the following before each ride.

Inspection Item	Inspection Objective
Engine oil	Inspect for proper fill level
Transmission oil	**Inspect for proper fill level (900ml)**
Coolant	Inspect for proper fill level
Fuel	Be sure there is enough fuel to ride planned distance
Cooling system	Inspect for leaks, cracks, and fluid flow
Throttle	Check for free travel of throttle grip and that the throttle grip has a smooth operation and in both the forward and back to the closed position
Clutch	Adjust the clutch cable to fully disengaged
Steering	Be sure the bars move freely from lock to lock and steering head is tight
Brake	Inspect for free travel of pedal and lever and that there is full braking power
Tire	Check tire pressure and inspect tires for cracks
Spokes	Inspect and tighten loose spokes if necessary
Other Bolts and Parts	Inspect attachment points and other bolts to ensure they are tight
Exhaust muffler	Inspect for loose bolts and the exhaust is secure

For Enduro and Super Moto Models version check below for additional requirements

WARNING

You should practice driving in a safe and spacious area if you ride this type of motorcycle for the first time

Riding with one hand is extremely dangerous; you should hold the two handle bars tightly with your both hands. In no circumstances can you release the handle bars.

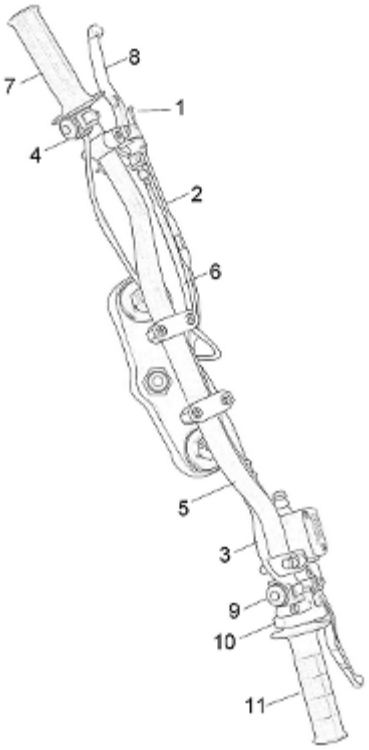
Do not accelerate when turning. You must reduce the speed to safety range.

If the ground is wet or slippery, you must reduce the speed.

At the exit of a tunnel or valley or when meeting large vehicles, you must be careful and reduce the speed.

Obey the transportation rules and limit your speed.

Starting the engine — EFI Models



Shift the transmission into neutral.

Pull in the clutch lever when starting the engine. For Dual Sport and motard version, turn the ignition switch to “ON” and push the engine start/stop switch to right side.

(For Off-road 450E version, the right switch should be turned to the left)

Close the throttle grip(11), operate the kick starter starting from the top of the kick starter stroke, kick through to the bottom with rapid, continuous motion.

COLD START:

For Electric Start, push and hold the button for 2-3 seconds. Then release. Then Push and hold button again for 5 seconds. If the bike does not start, repeat procedure.

If the engine backfires, it may be flooded. If this happens, hold the throttle 100% open and crank the engine with the starter. This disables the Fuel Injection and cleans out the cylinder.

Once engine is started, let the EFI go through the high idle warm up for 10-20 seconds.

Then pull and release throttle grip repeatedly to run engine idle until engine is heated, and close choke lever completely. If engine warming up takes time, run the engine idle with the choke lever slightly closed.

CAUTION
Do not keep the starter button pressed for more than 5 seconds at a time. Release the starter button for approximately 10 seconds before pressing it again. If the clutch lever(8) is pulled, the engine could be started in any gear.

Stop the engine

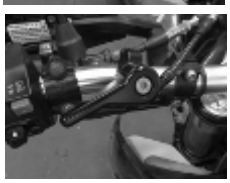
Shift the transmission into neutral

Push the stop button(4) (or push the engine start/stop switch to left side for enduro and motard version)

In case emergency engine stop, press the stop button directly (or push the engine start/stop switch to left side for enduro and motard version)

Turn the ignition switch to “OFF” if available on your bike

AWD Engagement



Switch Forward will switch OFF the AWD system. You can do this at any speed.

Switch Backward will turn ON the AWD system. This should only be done at low speeds (first gear).

BREAK-IN

CAUTION

The motorcycle is shipped with break in Oil only! Once the engine is run for an initial 30 minutes, drain and replace the oil with a Synthetic API SG or higher **SAE 10W-40**

Failure to do so may decrease the engine transmission life or cause premature failure.

During initial break-in newly machined surfaces will be in contact with each other and these surfaces will wear in quickly. Break-in maintenance at 150km is designed to compensate for this initial minor wear. Timely performance of the break-in maintenance will ensure optimum service life and performance from the engine.

The general rules as follows:

Start the engine and let it run at idle until the engine is thoroughly warmed up.

Avoid full-throttle starts and rapid acceleration.

Maximum continuous engine speed during the first 150km must not exceed 5,000 rpm (or 10 hours Max)

After 150km ride maintenance the machine per the maintenance schedule.

After the break-in procedure has been properly carried out, the motorcycle is ready for regular operation. However, since premature high r/min (rpm) will lead to engine trouble, take care to use the necessary skill and technique in operating the motorcycle.

Never run the engine with full throttle at low speed operation. This rule is applicable not only during break-in but at all times.

This procedure should be followed each time:

- Piston is replaced
- Piston rings are replaced
- Cylinder is replaced
- Crankshaft or crank bearing are replaced

The Maintenance Schedule specifies how often you should have your motorcycle served, and what things need attention. It is essential that your motorcycle be served as scheduled to retain its high level of safety, dependability, and emission control performance. Remember, proper maintenance is your responsibility.

PRECAUTION

Make sure the engine is off before you begin any maintenance or repairs.

Exhaust contains poisonous carbon monoxide. Be sure there is adequate ventilation whenever you operate the engine.

Let the engine and exhaust system cool before touching

Be careful when working around gasoline. Keep cigarettes, spark, and flames away from all fuel related parts

MAINTENANCE RULE

Place the motorcycle on the firm level ground using optional work stand or equivalent support

Use genuine or recommend part and lubricants or other equivalents. Parts that do not meet design specifications may cause damage to the motorcycle

Use only metric tools when servicing the motorcycle, metric nuts, bolts, screws are not interchangeable with British fasteners.

Always replace with new gaskets, O-rings, cotter pins, piston pin clips, snap rings, etc after disassemble engine

When tightening bolts and nuts, begin with larger diameter or inner bolt first. Then tighten to specified torque diagonally in incremental steps unless a particular sequence is specified.

Clean parts in cleaning solvent upon disassembly ,lubricate and sliding surface before assembly.

Always inspect all parts for proper installation and operation after reassemble

Route all electrical wires, cables and harness routing as designed.

MAINTENANCE SCHEDULE

Required maintenance schedule is based upon average riding condition. Sustained high speed operation, or operation in unusually wet or dusty conditions, will require more frequent service than specified in the REQUIRED MAINTENANCE SCHEDULE. See SPECIAL MAINTANCE SCHEDULE for competition maintenance need.

Perform the Pre-ride inspection at each scheduled maintenance period

Symbol in maintenance schedule means:

I Inspect and Clean , Adjust , Lubricate or Replace if necessary.

C Clean.

R Replace.

A Adjust.

L Lubricate.

* Unless the rider is mechanically qualified and has proper tools, see authorized dealer for service

* * Special maintenance strongly recommend to look for authorized dealer service.

NOTE1. Clean after every ride for dusty conditions

NOTE2. Replace every 2 years. Replacement requires mechanical skill

NOTE3. Replace after the first break-in ride

NOTE4. Inspect after the first break-in ride

NOTE5. Replace the transmission oil once change the clutch plate

Required Maintenance Schedule

	ITEMS	NOTE	km / Time	Maintenance Schedule in Kilometers						
			km	150	1500	3500	6000	9000	12000	15000
			Time	10 Hrs						
*	ENGINE OIL	(NOTE 3)		R	R	R	R	R	R	R
*	ENGINE OIL FILTER	(NOTE 3)			R		R		R	
	TANSMISSION OIL			R	R	R	R	R	R	R
	AIR CLEANER	(NOTE 1)				R			R	
	RADIATOR COOLANT	(NOTE 3)					R		R	
*	VALVE CLEARANCE	(NOTE 4)				I			I	
	SPARK PLUG					R			R	
* *	FUEL FILTER (In Tank)					C			C	
*	THROTTLE CABLE			I	I	I	I	I	I	I
*	THROTTLE OPERATION			I	I	I	I	I	I	I
	CRANKCASE BREATHER	(NOTE 2)		I	I	I	I	I	I	I
	COOLING SYSTEM			I	I	I	I	I	I	I
	SECONDAY AIR SUPPLY	(NOTE 2)		I	I	I	I	I	I	I
	DECOMPRESSOR SYSTEM			I	I	I	I	I	I	I
	ENGINE IDLE SPEED	(NOTE 4)		I	I	I	I	I	I	I
	DRIVE CHAIN	(NOTE1)		I, L	I, L	I, L	I, L	I, L	I, L	I, L
	DRIVE CHAIN SLIDER	(NOTE1)		I	I	I	I	I	I	I
	BRAKE FLUID	(NOTE3)		I	I	I	I	I	I	I
	BRAKE PAD WEAR			I	I	I	I	I	I	I
	BRAKE SYSTEM			I	I	I	I	I	I	I
*	HEADLIGHT FOCUS			I	I	I	I	I	I	I
	CLUTCH SYSTEM			I	I	I	I	I	I	I
	SIDE STAND			I	I	I	I	I	I	I
*	SUSPENSION			I	I	I	I	I	I	I
*	MUFFLER			I	I	I	I	I	I	I
*	NUTS .BOLTS .FASTENERS			I	I	I	I	I	I	I
* *	WHEEL / TIRES			I	I	I	I	I	I	I
* *	STEERING HEAD BEARINGS			I	I	I	I	I	I	I

SPECIAL MAINTENANCE SCHEDULE

FREQUENCY / ITEMS		NOTE	About 2.5hs	About 7.5 hs	About 15hs	About 22.5hs	About 30hs
SWING ARM/SHOCK LINKAGE				L			
FORK OIL	FORK TUBE/SLIDER	(NOTE3)		R			
	DAMPER					R	
NUTS . BOLTS. FASTENERS			I				
WHEELS / TIRES			I				
STEERING HEAD BEARINGS						I	

ENGINE

ITEM	CAUSE	REMARK
Cylinder head gasket	Compression leak	Replace whenever disassembled
Clutch disc	Wear or discoloration	
Cylinder gasket	Leakage	Replace whenever disassembled
Right crankcase cover gasket	Damage	Replace whenever disassembled

CHASSIS

ITEM	CAUSE	REMARKS
Front / rear tire	wear	Minimum knob height:8mm
Front / rear brake pad	wear	Minimum thickness:1mm
Sub-frame mounting bolts	Fatigue or damage	
Chain guide plate	Wear or damage	
Side cover	Damage	
Front number plate	Damage	
Front / rear fender	Damage	
Clutch lever / holder	Free play or damage	
Brake lever	Free play or damage	
Air throttle lever	Free play or damage	
Handlebar	Free play or damage	
Throttle housing	Bends or cracks	
Grip rubber	Damage	
Gearshift pedal	Damage	
Brake pedal	Damage	
Chain adjuster / bolt	Damage	
Air cleaner	Damage	

NOTE:

These parts and their possible replacement schedule are based upon average riding conditions.

Machines subjected to severe use require more frequent servicing.

FUEL LINE

- Inspect the fuel line for damage or leak, if necessary replace fuel line.

FUEL FILTER SURFACE

- Remove the fuel tank. Drain the gasoline into a container and remove the fuel line, nuts ,and the clamps.
- Wash the fuel filter and reinstall the O-ring and reinstall components onto the fuel tank.
- Reinstall the fuel tank on the motorcycle . Make sure the tank does not leak.

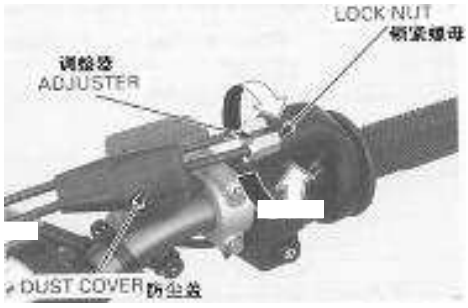
THROTTLE OPERATION

- Check for smooth throttle grip at full opening and automatic full closing in all steering positions.
- Check the throttle cable and replace them if they are deteriorated, kinked or damaged.
- Lubricate the throttle cable if throttle operation is not smooth.
- Measure the free play at the throttle grip flange.

FREE PLAY：

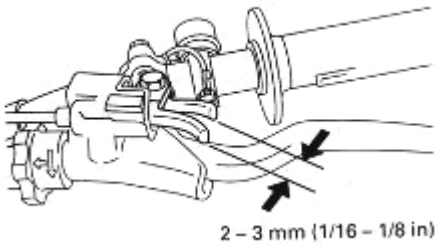
3-5mm(1/8-3/16in)

- Throttle grip free play can be adjusted at either end of the throttle cable.
- Minor adjustments are made with the upper adjuster. Remove the dust cover from the adjuster. Adjust the free play by
- Loosening the lock nut and turning the adjuster.
- Tighten the lock nut after making the adjustment. Reinstall the dust cover and recheck the throttle operation.
- Major adjustments are made with the carburetor end of cable.

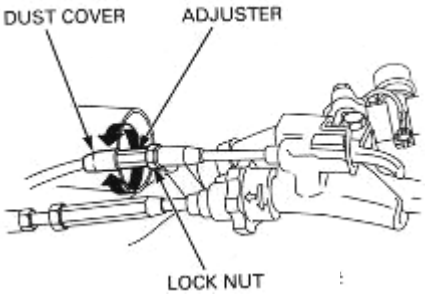


AWD Lever

FREE PLAY: 2-3mm(1/8-3/16in)

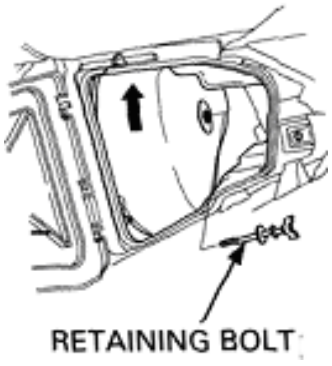


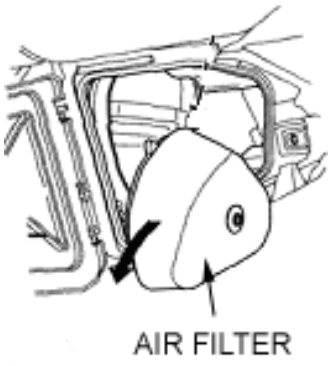
- Check for smooth Lever operation and lubricate the cable if required.
- Inspect the cable for cracks which could allow moisture to enter. Replace the cable if necessary.
- Measure the lever free play at the lever end. Lever free play can be adjusted. Adjust the free play by loosening the lock nut and turning the adjuster.
- Tighten the lock nut. Reinstall the dust cover. Recheck the free play at the lever.



AIR FILTER

- Loosen the air cleaner retaining bolt. Remove the air filter.
- Remove the air filter from the holder.
- Thoroughly wash the air filter in clean non-flammable or high flash-point cleaning solvent. Then wash the element again in a solution of hot water and dishwashing liquid soap. Clean the inside of the air cleaner housing.
- After cleaning, be sure there is no dirt or sand trapped between the inner and outer layer of the cleaner. Wash again if necessary.
- Allow the air cleaner to dry thoroughly. After drying, soak the air filter in clean Foam Filter Oil or an equivalent.
- Apply air filter oil to the entire surface of the air filter and rub it with both hands to saturate the element with oil.
- Gently squeeze out excess oil. It is important not to over oil or under oil the element. Apply a thin coat of grease or an equivalent to the sealing surface.
- Assemble the air filter and the holder .Slip the air cleaner retaining bolt through the assembly. Tighten the retaining bolt securely.

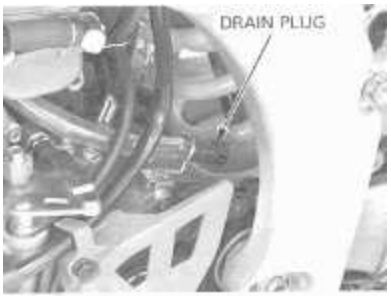


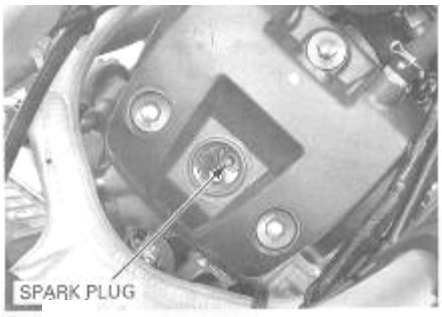


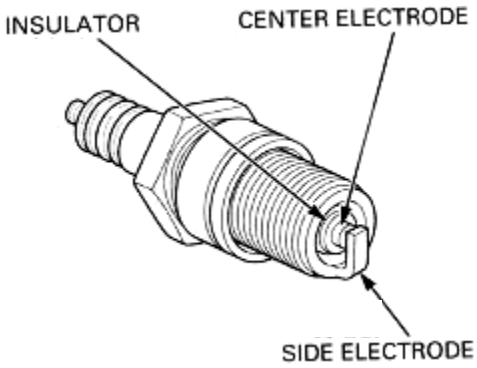
NOTICE: If the air filter assembly is not installed correctly ,dirt and dust may enter the engine resulting in wear of the piston ring and cylinder.

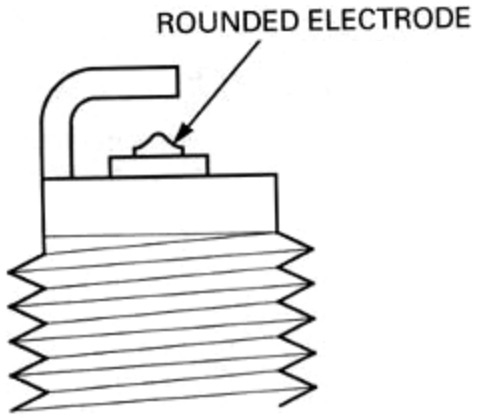
CRANKCASE BREATHER

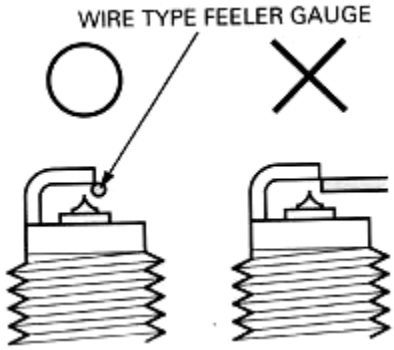
- Remove the breather hose drain plug, then drain any fluids or dirt from the hose into a proper container. Reinstall the drain plug.











SPARK PLUG

REMOVAL

- Remove the fuel tank and disconnect the spark plug cap. Remove The spark plug and inspect it for damage
- Clean around the spark plug base with compressed air before removing and be sure that no debris is allowed to enter the combustion chamber.

INSPECTION

- Check the following and replace if necessary:

1. ·insulator for damage
2. ·electrodes for wear
3. ·burnt or discoloration

- If the electrode is contaminated with accumulated debris or dirt replace the spark plug.

(this motorcycle's spark plug is equipped with an iridium center electrode. Replace the spark plug if the electrode is contaminated.)

- Replace the plug if the center electrode is rounded as shown in the picture.

(Always use the specified spark plugs on this motorcycle)

RECOMMENDED SPARK PLUG (OR EQUIVALENT)

Standard: DENSO: IK24

Optional : DENSO: IK27

Check the gap between the center and side electrodes with a wire

Type feeler gauge

(To prevent damaging the iridium center electrode, use a wire type

Feeler gauge to check the spark plug gap. Do not adjust the spark

Plug gap if the gap is out of specification , replace with a new one.)

Spark plug gap: 0.4mm

Make sure that the 1mm diameter plug gauge does not insert between the gap.

If the gauge can be inserted into the gap , replace the plug with a new one.

INSTALL

- Reinstall the spark plug into the cylinder head and hand tighten , then torque to specification.

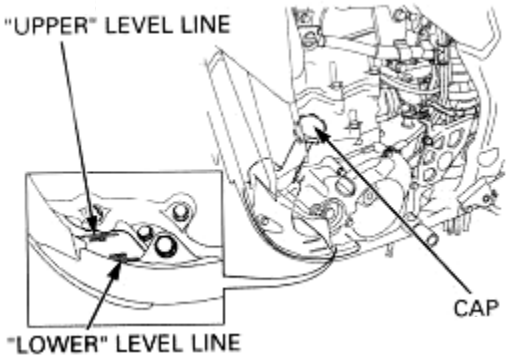
Torque: 22N.m(2.2kgf.m,16lbf.ft)

RADIATOR COOLANT

- Inspect the level of the radiator coolant should be between “upper” and “lower” when the motorcycle running under the normal temperature.

If need , put recommended coolant fluid in:

- Remove the radiator cap . Put standard coolant concentration 1:1 to the upper line and then reinstall the cap.

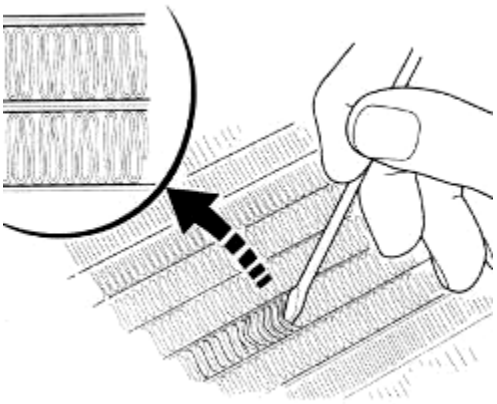


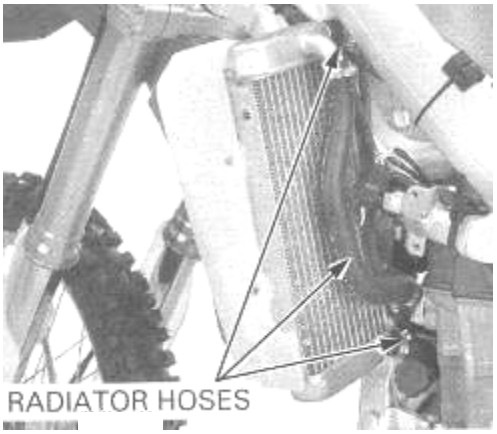
Recommended antifreeze

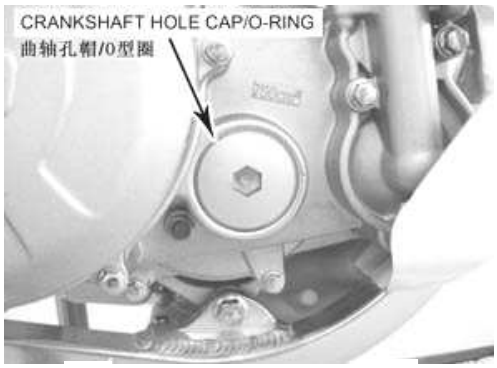
Professional coolant or an equivalent high quality ethylene glycol antifreeze containing silicate free corrosion inhibitors.

COOLING SYSTEM

- Remove the radiator grills. Check the radiator air passage for clogs or damage.
- Inspect the hoses for cracks and deteriorations.
- Use low pressure water and a soft brush to wash off any dirt that may be stuck in the radiator core.
- Replace if necessary. Check the tightness of the hose clamps and radiator mounting bolts.







VALVE CLEANCE / DECOMPRESSOR SYSTEM

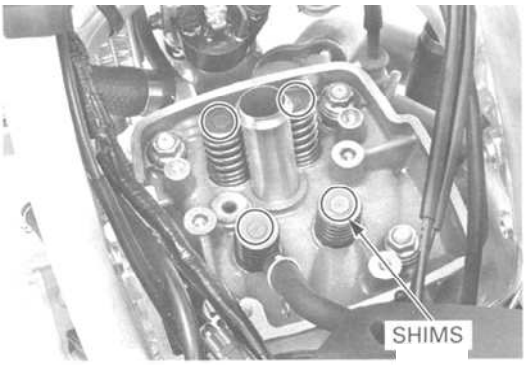
VALVE CLEARANCE INSPECTION

- Inspect and adjust the valve cleanse while the engine is cold (below35℃/95ºf)
- Remove the cylinder head cover.
- Remove the crankshaft hole cap and O-ring.
- Turn the crankshaft clockwise to align the punch mark with the index mark on the right crankcase cover. Make sure the piston is at TDC(Top Dead Center) on the compression stroke.
- Check that the index line on the cam sprocket aligns with the "△" mark on the cam holder.

INTAKE VALVE:

- Insert the feeler gauge between the valve lifter and the cam labe.
- Check the valve clearance for the intake valves using a feeler gauge.

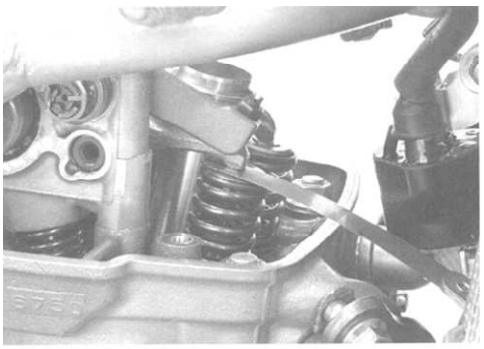
Valve clearance IN: 0.16±0.03mm



EXHAUST VALVE:

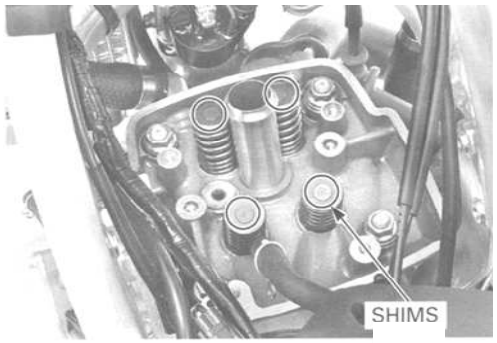
- Insert the feeler gauge between the rocker arm and shim.
- Check the valve clearance for the exhaust valves using a feeler gauge.

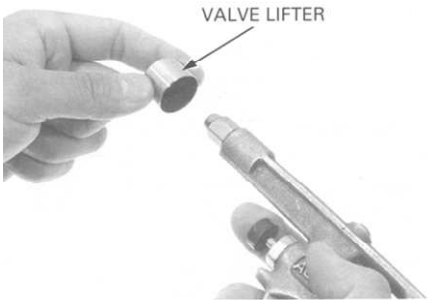
Valve clearance Ex: 0.28±0.03mm

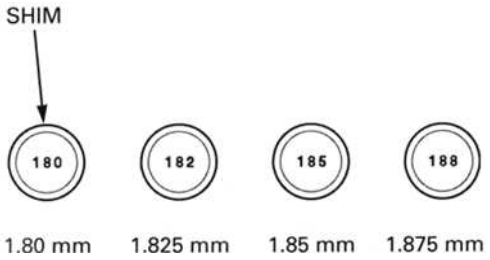


VALVE CLEANCE ADJUSTMENT:

- Remove the camshaft holder assembly
- The shims my stick to the inside of the valve lifter.
- Do not allow the shims to fall into the crankcase.
- The shims can be easily removed with tweezers or a magnet.
- Clean the valve shim contact area in the valve lifter with compressed air.
- Measure the shim thickness and record it.







Seventy-three different shim series are available from 1.2000mm to 3.000mm in intervals of 0.025mm.

- Calculate the new shim thickness using the equation below:

  A=(B-C)+D

  A: new shim thickness

  B: recorded valve clearance

  C: specified valve clearance

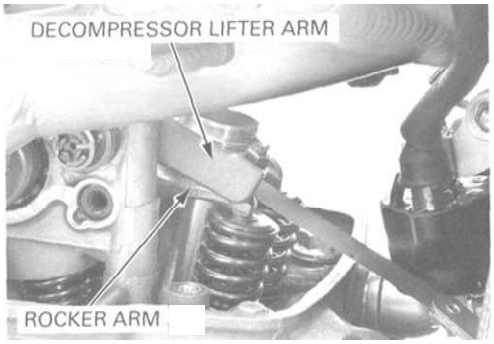
  D: old shim thickness

- Make sure of the correct shim thickness by measuring the shim using a micrometer

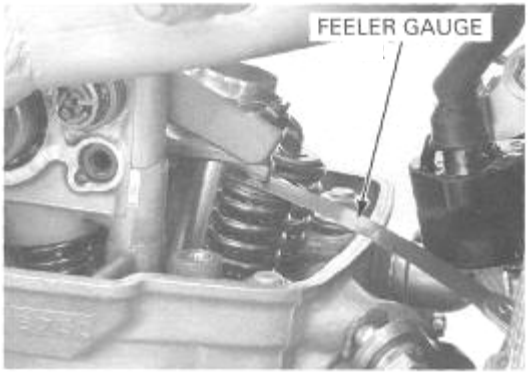
- Reface the valve seat if carbon deposits result in a calculated dimension of over 3.000mm.
- Install the valve lifters into the camshaft holder assembly.
- Install the camshaft holder assembly
- With the valve clearance adjusted , check and adjust the decompressor clearance
- Reinstall the cap and hand tighten , then torque to specification.

Torque: 15N.m(1.5kgf,11 lbf.ft)

DECOMPRESSOR CLEARANCE INSPECTION / ADJUSTMENT:



- Inspect and adjust the decompressor clearance while the engine is cold (below 35⁰C/95⁰F)
- Remove the crankshaft hole cap.
- Turn the crankshaft clockwise to align the punch mark with the index mark on the right crankcase cover.
- Make sure that the piston is at Top Dead Center on the compression stroke.
- Measure the decompressor arm clearance by inserting a feeler gauge between the decompressor arm adjusting screw and right side rocker arm.



DECOMPRESSOR CLEARANCE:

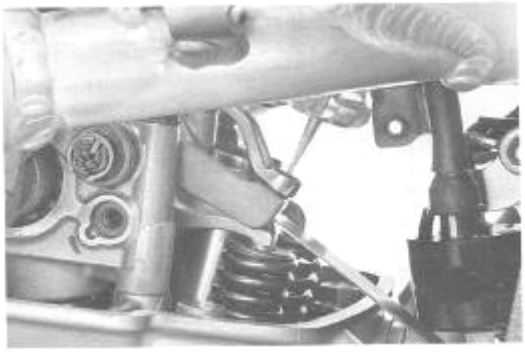
RIGHT SIDE EXHAUST VALVE CLEARANCE+ 0.15mm

EXAMPLE:

If measured right exhaust valve clearance is 0.28mm,

decompressor clearance is :0.28mm +0.15mm =0.43mm

If decompressor clearance needs adjustment, see following procedure.



- Measure the right exhaust valve clearance by inserting a feeler gauge between the right side rocker arm and shim.

VALVE CLEARANCE:

EX:0.28mm±0.03mm

- Pull out the feeler gauge between the rocker arm and shim
- Insert the feeler gauge (right exhaust valve clearance +0.15mm between the adjusting screw and right side rocker arm.
- Loosen the lock nut and turn the adjusting screw until there is a slight drag on the feeler gauge.
- Hold the adjusting screw and tighten the lock nut.

TORQUE : 10N.M

- Recheck the decompressor clearance.
- Reinstall the cylinder head and the cap.

ENGINE IDLE SPEED

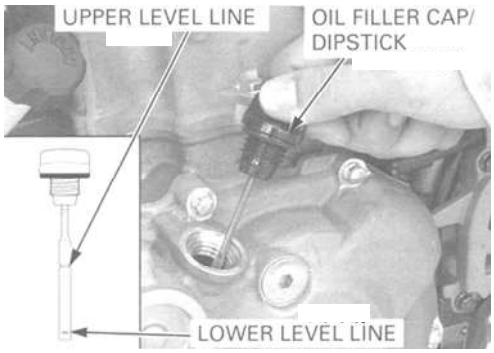
The engine must be warm for an accurate idle inspection and adjustment. Ten minutes of stop and go riding is sufficient.

- Warm up the engine, shift the transmission into neutral and hold the motorcycle upright.
- Turn the throttle stop screw to obtain the specified idle speed.

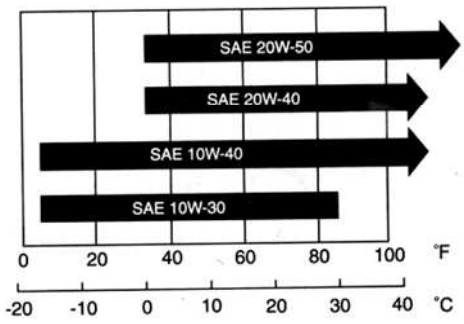
IDLE SPEED: 1,800±100 rpm

ENGINE OIL / OIL FILTER

OIL LEVEL INSPECTION



- Run the engine at idle speed for 3 minutes, then stop it for 3 Minutes.
- Support the motorcycle in an upright position on a level surface.
- Remove the oil filter cap/dipstick and wipe the oil with clean cloth.
- Insert the dipstick without screw in, take it out and check the oil level.
- If the oil level is lower or near the lower level line on the stick, add recommended oil to the upper level line through the hole.
- Reinstall the engine oil filter cap



(other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range)

RECOMMENDED ENGINE OIL:

HP4M (with molybdenum additives) 4-stroke oil , or equivalent motor oil

API service classification : SG or higher

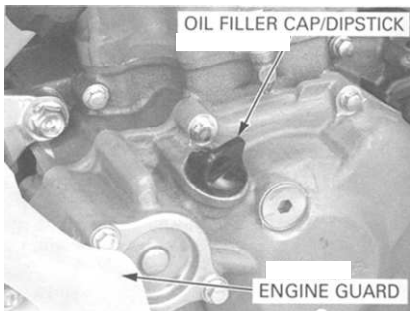
JASO T 903 STANDARD :MA or MB, viscosity : SEA 10W -40

OIL CAPACITY

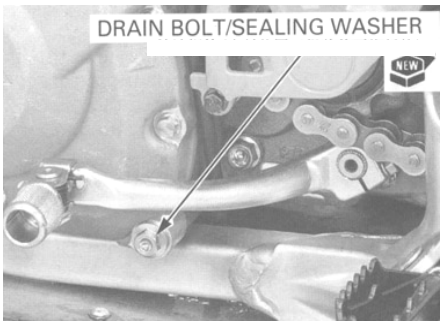
0.67liter at draining

0.70liter at oil filter change

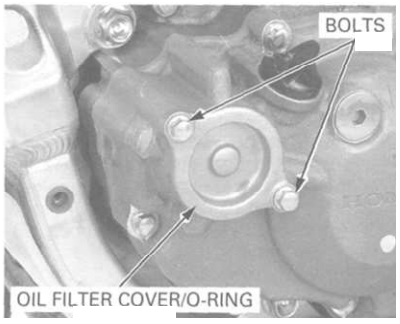
ENGINE OIL & FILTER CHANGE



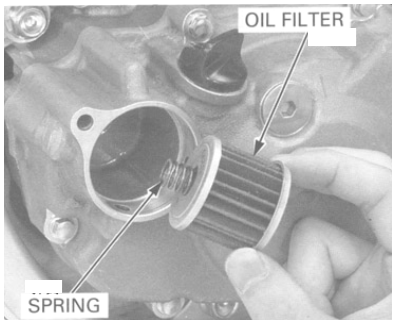
- Run the engine for 3 minutes. Stop the engine for 3 minutes and remove the oil filter cap.
- Remove the left side engine guard.
- Place an oil pan under the engine to catch the oil and remove the engine oil drain bolt and sealing washer to drain the engine oil.
- Operate the kick starter pedal several times while pushing the engine stop switch , so the engine oil completely drains.
- Remove the bolts and oil filter cover.
- Remove the oil filter and spring.
- Install the engine oil drain bolt with a new sealing washer.
- Tighten the engine oil drain bolt to the specified torque.



TORQUE: 16N.m



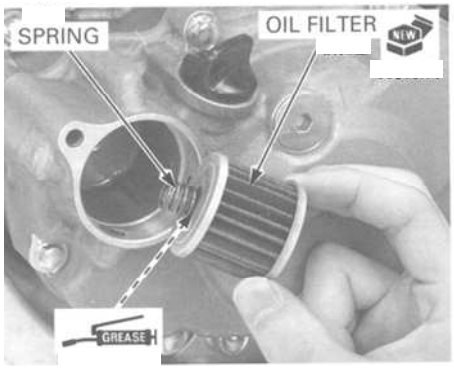
- Apply grease to the filter side of the spring end. Install the spring into the oil filter as shown.
- Install the oil filter with the “OUT SIDE” mark facing out. Installing the oil filter backwards will result in severe engine damage.
- Apply engine oil to a new O-ring and install it to the oil filter cover.
- Install the oil filter cover and tighten the bolt to the specified torque.
- Fill the engine with the recommended engine oil and Install the oil filter cap.
- Start the engine and let it idle for a few minutes.
- Stop the engine and recheck the oil level and check for leaks.
- Install the engine left side guard

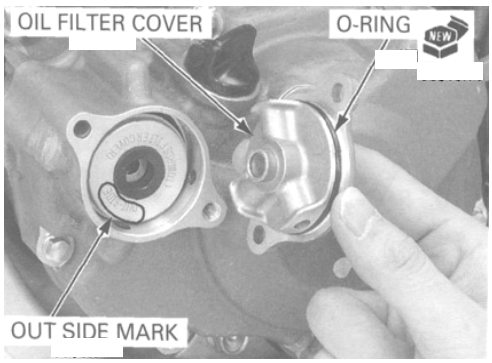


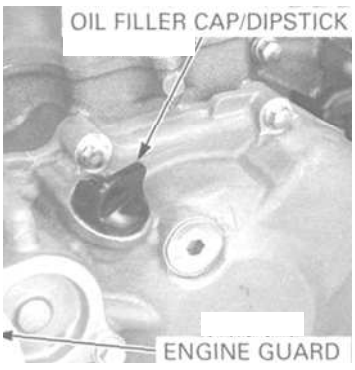
ENGINE OIL CAPACITY:

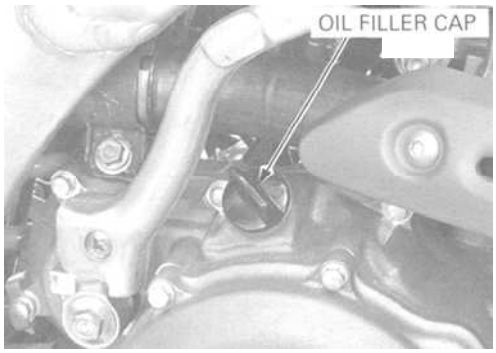
0.67liter at drain

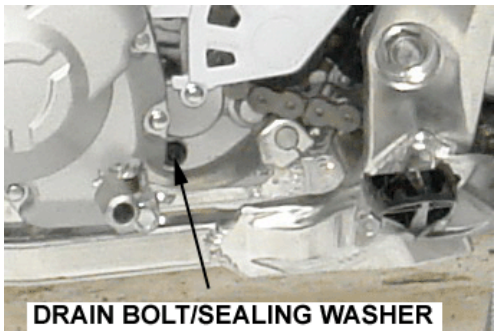
0.70liter at change











TRANSMISSION OIL

CHECKING OIL

- Run the engine at Idle for 3minutes, turn off engine and wait 3 minutes.
- Support the motorcycle on a level surface and remove the transmission oil filler cap, engine check bolt and sealing washer from the right crankcase cover. A small amount of oil should flow out of the check bolt hole.
- If no oil flow out, fill with recommended transmission oil through fueling hole until it can flow out of the hole.
- Reinstall the oil check bolt and engine oil filler cap. Repeat steps above
- After checking the oil level or filling, install the oil check bolt with a new sealing washer, tighten the oil check bolt and oil filler cap.

CHANGING ENGINE OIL

- Run the engine to let it get hot before draining oil.
- Support the motorcycle in an upright position on a level surface and remove the engine oil filler cap from the right crankcase cover
- Place an oil drain pan under the engine to catch the oil. Then remove the drain bolt and sealing washer.
- After the oil has drained, install the drain bolt with a new sealing bolt to the specified torque

Torque: 22N.M

- Fill the recommend oil to the engine.

Recommended transmission oil: APLGL

Viscosity: SAE 10w-40

Capacity: 0.85 liter at draining

0.900 liter at removing

- Inspect the oil level as the steps of oil level checking procedure.

DRIVE CHAIN

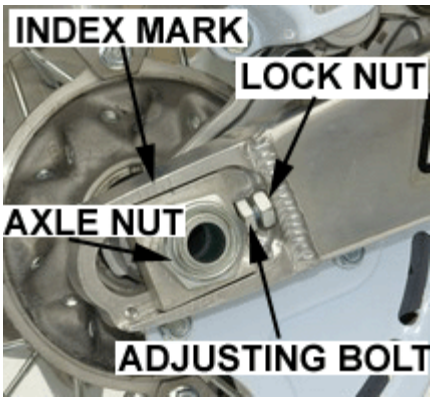
The drive chain must be checked, adjusted, and lubricated in accordance with the Maintenance Schedule. If the chain becomes badly worn or maladjusted, being either too loose or too tight the chain could jump off the sprockets or break.

Under severe usage, or when the vehicle is ridden in unusually dusty or muddy areas, more frequent maintenance will be necessary.

WARNING:

A chain that breaks or jumps off the sprockets could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing it to go out of control.

DRIVE CHAIN SLACK INSPECTION



- Turn the engine off, raise the rear wheel off the ground by placing the optional work stand.

(Don't inspect and adjust the drive chain when the engine running)

- Check slack in the upper drive chain run midway between the sprockets.

Drive chain slack: 25-35mm

Notice: Excessive chain slack(50mm/2.0in) may damage the vehicle.

- In addition to checking the slack, rotate the rear wheel to inspect the drive chain and sprockets for damaged rollers, loose pin and links, unevenly or excessively worn or damaged teeth.

ADJUSTMENT

- Adjust the chain if the slack is too much or too little.
- Loosen the axle nut and adjuster lock nuts and turn the adjusting bolts.
- Check that the chain adjuster index marks are in the same position on both sides, then tighten the axle nut..
- Tighten the adjusting bolt lock nut against the axle adjustment plates.

REPLACEMENT

If adjustment procedure can not apply proper chain slack or the chain has damaged rollers, loose fitting links, replace with new one.

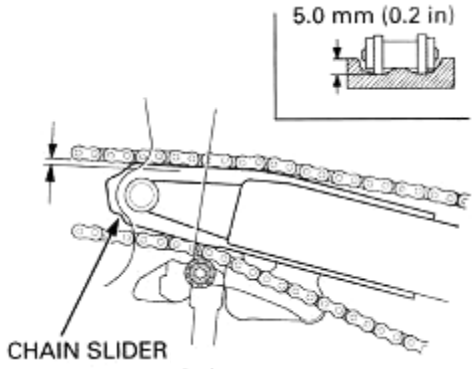
Whenever the chain is replaced, inspect both the countershaft and rear sprockets, and replace them if necessary. Worn sprockets will cause a new chain to wear quickly.

CLEANING AND LUBRICATION

Clean the chain in non-flammable or high flash-point solvent by soft brush. Wipe it dry.

Be sure the chain is completed dry before lubricating.

Lubricate the drive chain with #80-90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Apply oil to the side of the rollers so that it will penetrate to the rollers and bushings. Wipe off any excess oil.



DRIVE CHAIN SLIDERS

Chain slider

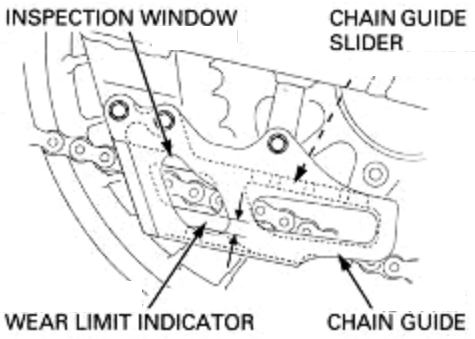
- Inspect the drive chain slider for excessive wear.

Service limit:5.0mm from upper surface

Notice:

If the chain slider becomes worn though to the swingarm, the chain will wear against the swingarm.

- check the chain guide and chain guide slider for alignment, wear or damaged.
- Replace the chain guide if it is damaged or worn.
- Replace the chain guide slider if the chain is visible through the wear inspection window.



DRIVE CHAIN ROLLER

Inspect the drive chain roller for excessive wear or binding.

Service limit:

Minimum roller O.D: Upper: 39mm/Lower: 35mm

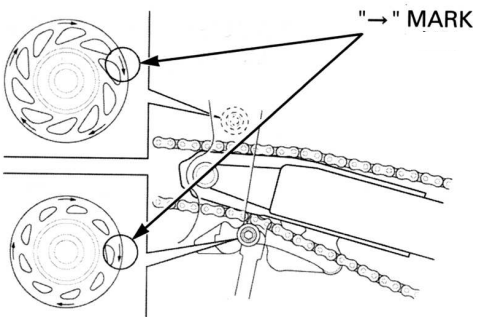
- Replace the roller if necessary, and tighten the roller bolt/nut to the

specified torque.

(The sign"→" means installing the drive chain roller outside)

Torque:Upper bolt: 12N.m

Lower nut: 12N.m



DRIVE/DRIVEN SPROCKETS

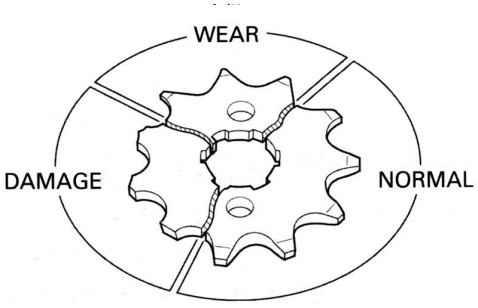
- Inspect the drive and driven sprocket teeth for wear or damage and replace if necessary.

Do not install the new drive chain on worn sprocket. The chain and sprockets must be in good condition, or the new chain will wear rapidly.

- Inspect the bolts and nuts on the drive and driven sprockets.
- Tighten them when they become loosened.

Torque: Drive sprocket bolt: 31N.m

Driven sprocket nut: 32N.m



BRAKE FLUID

Notice

- Avoid spilling fluid will damage the plastic or rubber parts. Place a rag over these parts whenever the system is serviced.
- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.

Fluid level inspection

When the fluid level is low, check the brake pads for wear. A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check the entire system for leaks.

Front brake

- Position the site level in the horizontal position.
- If the level is near the low level line, check the brake pad wear.

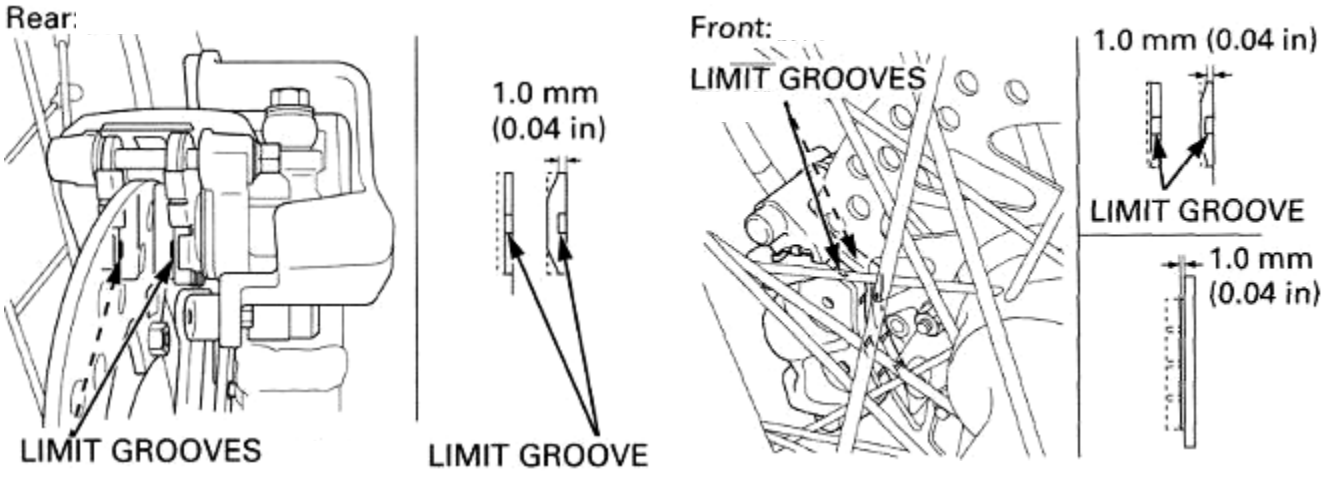
Rear brake

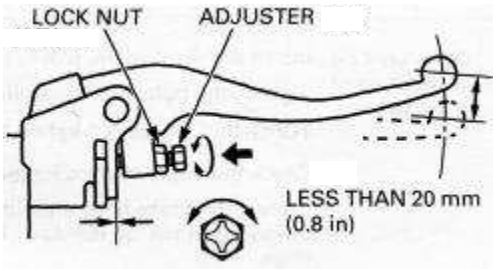
- Support the motorcycle in an upright position on a level surface and check the rear brake fluid level.
- If the level is near the low level line, check the brake pad wear.

BRAKE PAD WEAR

- Check the brake pads for wear.
- Replace the brake pads if either pad is worn to the bottom of the wear limit groove.

Service limit: 1.0mm





BRAKE SYSTEM

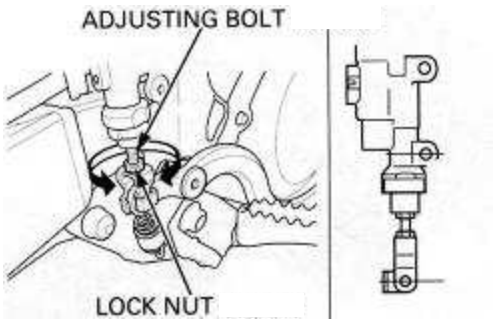
level position inspection

The brake level position can be adjusted by loosening the lock nut and turning the adjuster. Turning the adjuster clockwise moves the brake lever farther away from the grip; turning the adjuster counterwork wise moves the brake lever closer the grip.

After adjustment, hold the adjuster and tighten the lock nut to the specified torque.

Torque: 5.9N.m

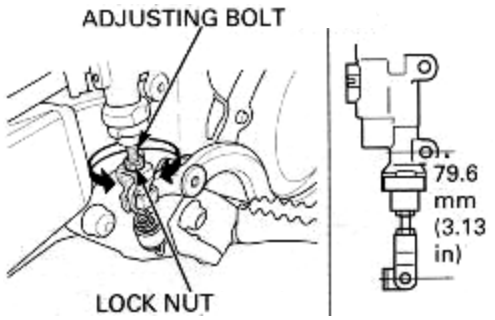
If the brake lever free play exceeds 20mm,there is air in the system that must be bled.



Brake pedal height

- Adjust the brake pedal to the desired height by loosening the lock nut and turning the pedal height adjusting bolts.

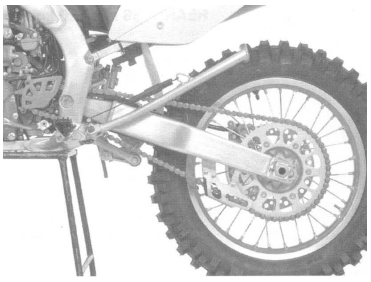
Standard height: 79.6mm



- Tighten the lock nut to the specified torque

Torque: 5.9N.m

SWINGARM/SHOCK LINKAGE



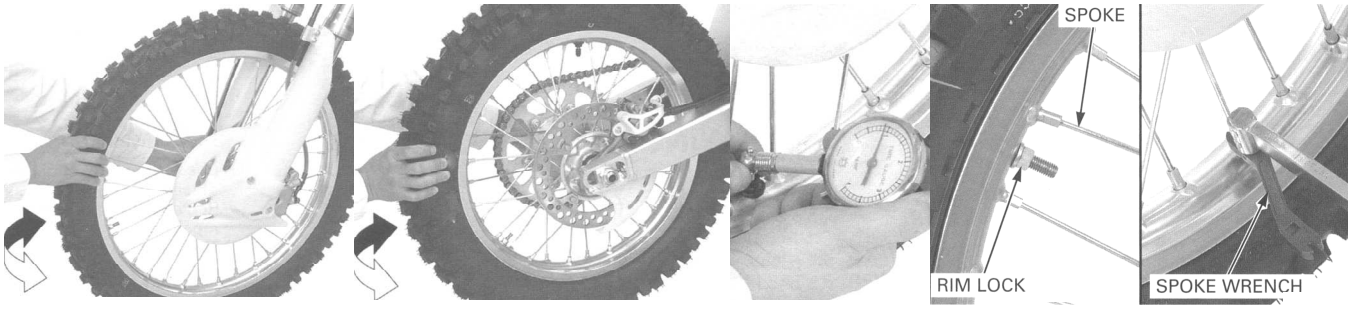
- Raise the rear wheel off the ground by placing a work stand or equivalent under the engine.
- Check for worn swingarm bearings by grabbing the rear swingarm and attempting to move the swingarm side-to -side.
- Replace the bearing if excessively worn.
- Check the shock linkage and replace any damaged needle bearings.
- Disassemble, clean, and inspect the swingarm and shock linkage pivot bearing and related seals every three races or about 7.5 hours of operation.

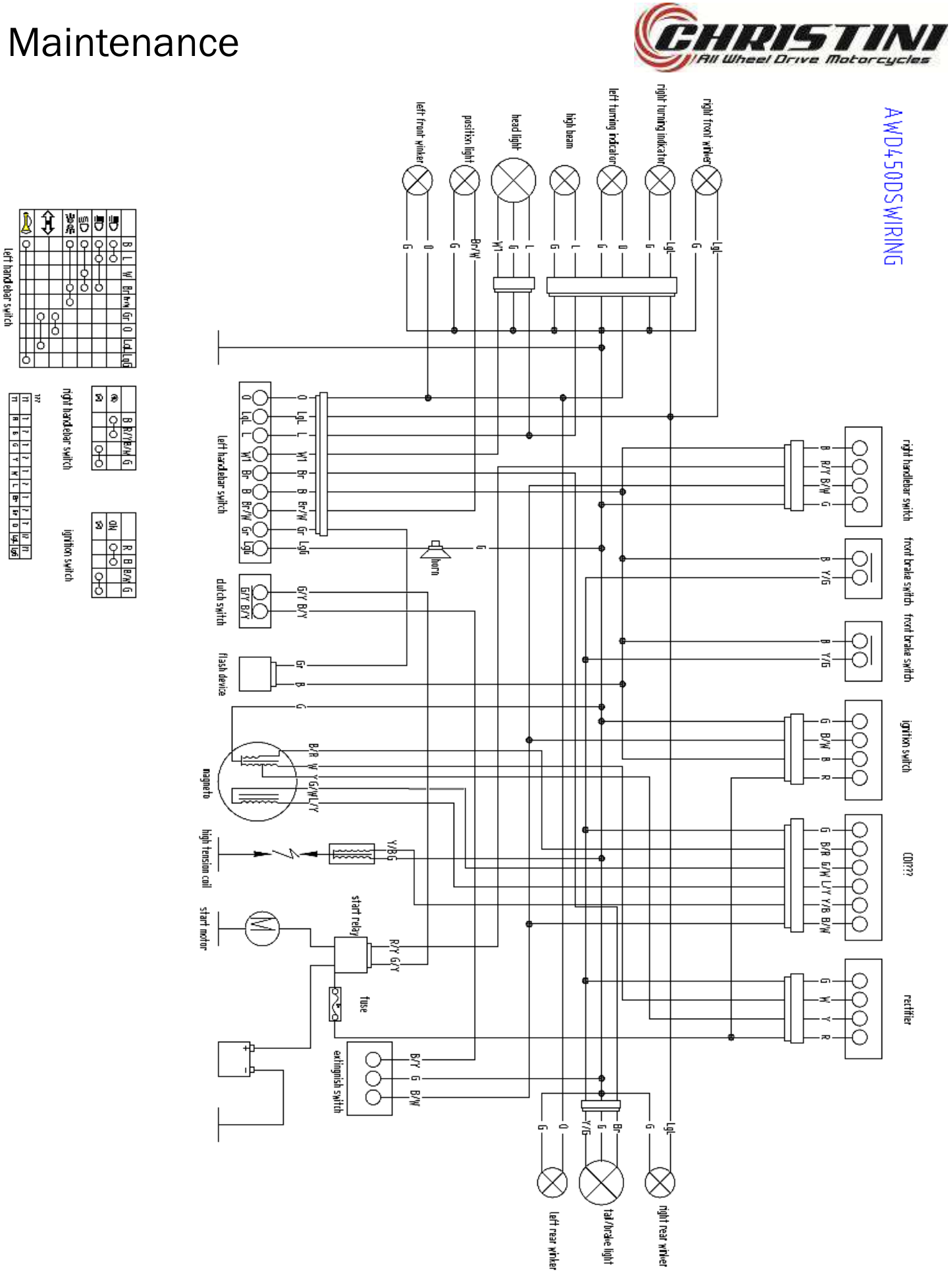
WHEELS/TIRES

- Support the frame by the bracket under the engine, so that the front wheel off the ground.
- Grab the bottom of front suspension and rock the front wheel on both sides to check whether the front wheel axle is loose.
- Grab the rocker and rock the rear wheel on both sides to check whether the rear wheel axle has problem.
- Check the tires for cuts, embedded nails, or other damage.
- Check the cold tire pressure (Remember to do it when the tire is cold).
- Check the rims and spoke for damage.
- Tighten all the loose wheel spokes and lock (valve nut)

Torque Specs

- Tire pressure Front wheel :98kPa(1.0kgf/cm^2,14psi)
- Rear wheel:98kPa(1.0kgf/cm^2,14psi)
- Tools:Front wheel:Spoke wrench Rear wheel: Spoke wrench 6.6mm
- Torque Front wheel spoke:3.68N.m(0.4kgf.m,2.7lbf.ft)
- Rear wheel spoke:3.7N.m(0.4kgf.m,2.7lbf.ft)
- Valve nut:13N.m(1.2kgf.m,9lbf.ft)




AWD450DSWIRING
right front winker
right turning indicator
left turning indicator
high beam
head light
position light
left front winker
right handlebar switch
front brake switch
front brake switch
ignition switch
CDI???
rectifier
left handlebar switch
horn
clutch switch
flash device
magneto
high tension coil
start motor
start relay
fuse
emfingnish switch
left rear winker
tail/brake light
right rear winker
left handlebar switch
right handlebar switch
ignition switch

AWD Service Section

The Tools You Will Need for Maintenance

- Socket set, metric
- Pliers set
- Ball peen/ dead blow hammers
- Soft tip metal punch (brass/aluminum)
- Screw driver set
- AWD clutch wrench (optional)
- Open ended wrenches, metric
- Allen key set, metric
- Snap ring pliers, 45 or 90 degree
- Bearing punch set
- Blind side bearing removal kit (Motion Pro 08-0292)
- 2 large adjustable wrenches
- Torque wrench 0-75 ft-lbs
- Split bearing puller
- Small pick or awe
- Safety wire pliers
- Safety wire .032”
- Grease gun (included with bike purchase, customer must supply grease below)
- Shell Albida EP1 Lithium grease (do not substitute)
- Spectro SPL grease or equivalent
- Blue Loctite #242
- Red Loctite #262
- Green Loctite #609

Headtube Gearbox
Preload Bars
Top Triple Clamp
Bottom Triple Clamp
Clutch Assembly
Linear Bearing Housing
Main Gearbox (behind Sidebar)
Spline Shaft Bellows
Sidebar Cover
Shaft Sprocket
AWD Hub
Dropout

- Do not adjust the choke while the bike is moving!
- Do not over tighten the front axle as it can damage the inside Axle Clamp Bearings.
- Do not engage the AWD system while at high speeds. Disengagement of the AWD system can occur at any speed.
- Be cautious when power washing bike, especially around front drive hubs and AWD seals. Spraying high pressure water into these areas can damage seals and bearings.

Pre-ride check list:

- Check secondary AWD chain tension.
- Lube secondary AWD chain.
- Check clutch setting (see “AWD Clutch Test” section).
- Check front wheel for proper function (see “Front Wheel Sprag Test” section)
- Check front wheel rim lock nut torque.

As Needed

- Replace bearings if excessive noise or friction develops.
- Lubricate spline shafts through grease port with supplied grease gun and Shell grease.
- Replace worn or damaged seals and boots.

AVOID:

- Pressure washing the dropouts, head tube area, side bar and main gearbox.

AWD Clutch Test

- Place the bike on a stand and make sure that the front wheel is not touching the ground.

- Shift the bike into gear.

- Turn the AWD switch to the on position and check to make sure the AWD is engaged.

- Grab the front wheel with two hands and try to spin it backwards. The front wheel should spin backwards but require a large amount of effort to do so. If the wheel will not break free, the clutch is set too high. If the wheel turns backwards very easily, the clutch is set too low.

- If the clutch needs to be adjusted, pull the gas tank off the bike.

- Loosen the set screw on the clutch locknut.

- Turn the locknut in or out a 1/2 turn at a time until the front wheel moves backward with the correct amount of force. To keep driveshaft from spinning apply front brake.

- Make sure the set screw is positioned over a flat in the clutch hub and tighten the set screw down and reinstall the tank.

Front Wheel Sprag Test

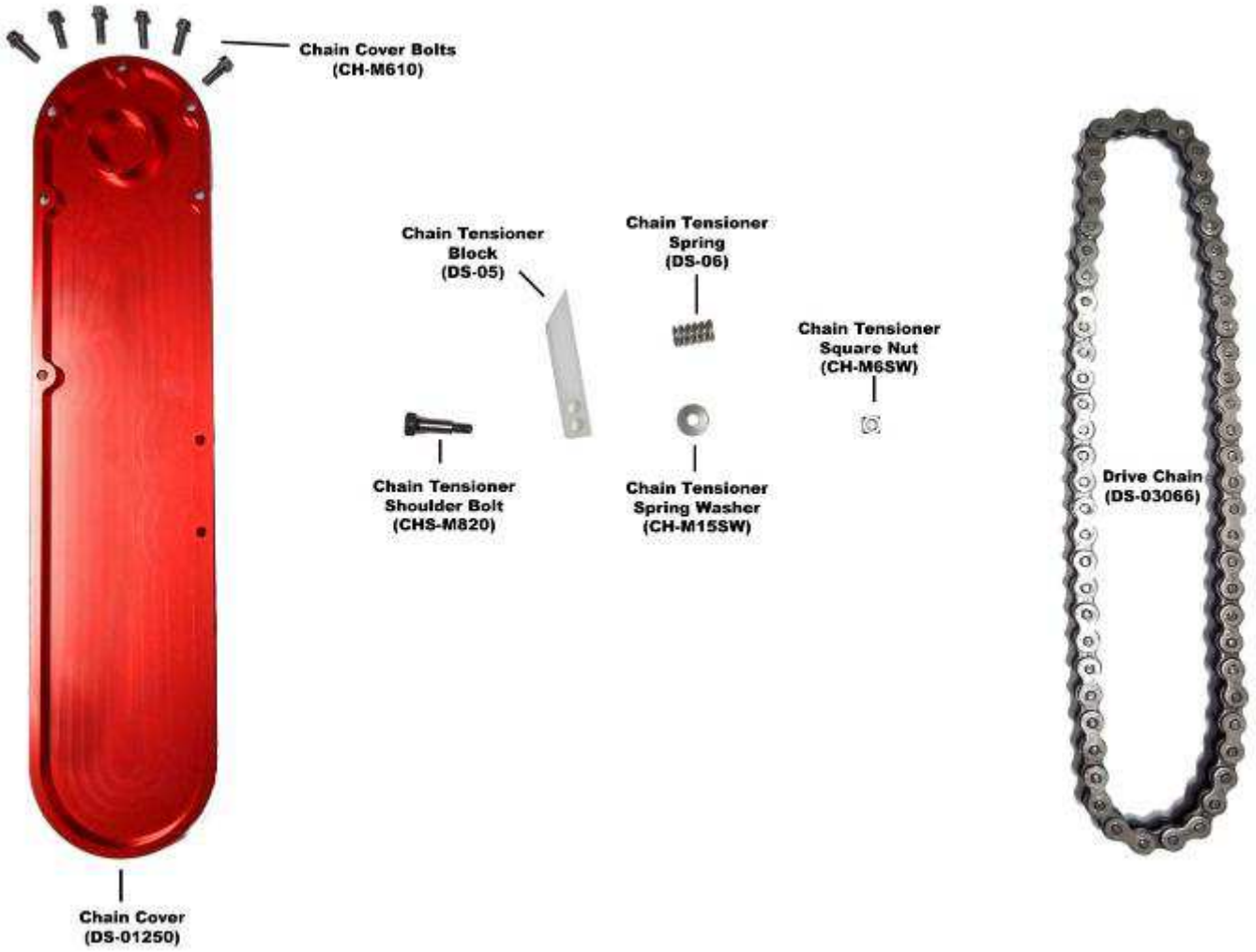
Note: Before performing this test, make sure the AWD Clutch is set correctly.

- Place the bike on a stand and make sure that the wheels are not touching the ground.
- Turn the AWD switch to the on position and check to make sure the AWD is engaged.
- Center the handlebars.

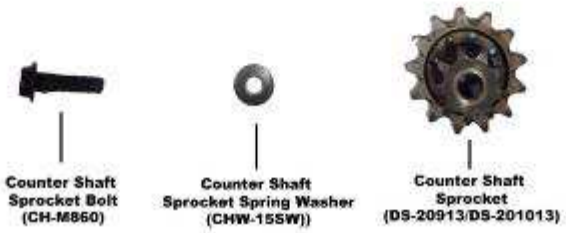
- Hold down the front and rear brakes.
- Turn handlebars to the **left** and back to center. There should be steering resistance from the AWD system when this is performed.
- Release brakes and center handlebars.
- Hold down front and rear brakes again and turn handlebars to the **right** and back to center. There should be steering resistance from the AWD system.

- If no resistance is felt, or there is only resistance in one direction, check the front wheel to ensure the sprag bearings are not slipping or damaged. See “Front Wheel Service” section.

Cover and Chain Removal



Chain Cover Bearing
(CB-6804)
External Engagement
Hub Snap Ring
(CSR-17B)
Engagement Spline
Hub
(DS-04)
Side Bar
Seal
(CS-32424)
To Chain Cover
To Side Bar
Chain Cover Seal
(CS-24324)
Engagement Hub Sprocket
(DS-0515/DS-0516)
Internal Engegment
Hub Snap Ring
(CSR-14B)
Chain Cover
Bearing
(CB-6905)


Counter Shaft
Sprocket Bolt
(CH-M860)
Counter Shaft
Sprocket Spring Washer
(CHW-155W))
Counter Shaft
Sprocket
(DS-20913/DS-201013)

Cover and Chain Removal

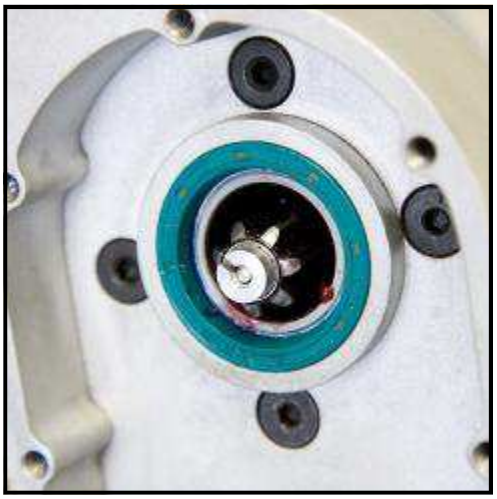
- Remove the 6 cover bolts with an 8mm socket or t-handle and pull cover off of the frame.

- To remove the chain, pull the tensioner back with a flat blade screwdriver and pull the sprocket out with fingers or non-marring pliers. Remove the chain from countershaft sprocket.

- Check the following and replace if needed:

    1. Sidebar bearing and cover bearing should be smooth turning.
    2. Check engagement spline action by engaging and disengaging switch on handle bars.
    3. Sidebar seal and cover seal for wear.
    4. Excessive wear on chain tension block.

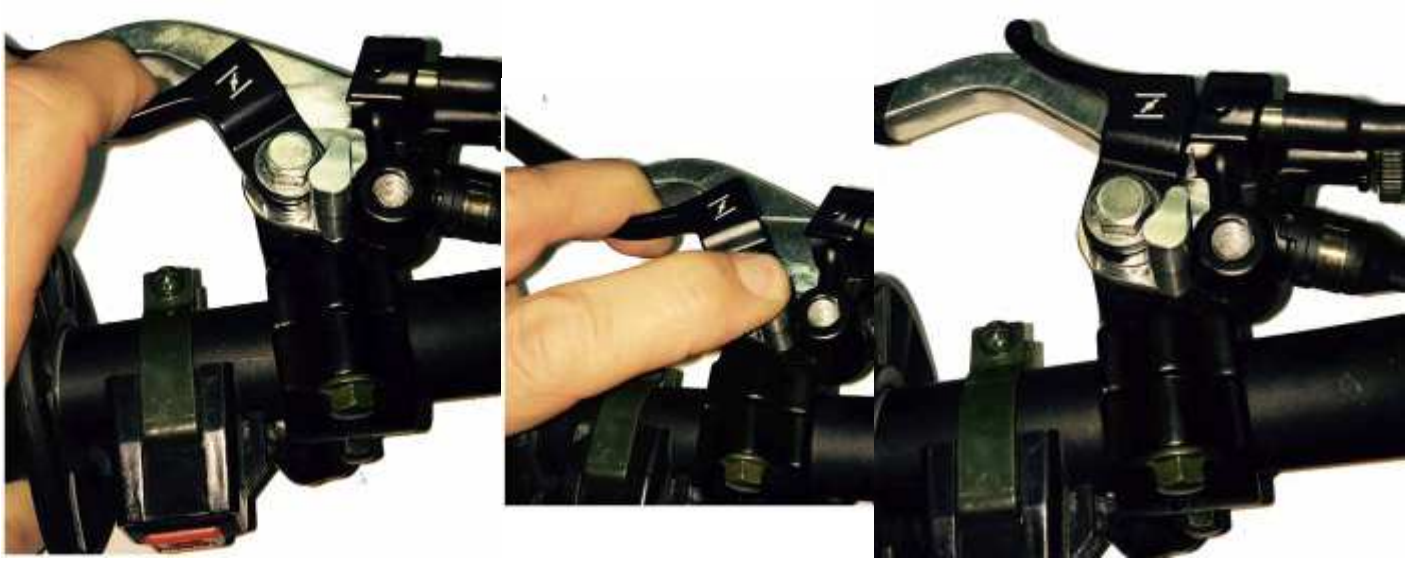
    Warning: Do not use an O-ring chain as there is not enough clearance for one and it would rub the frame.



- Reinstall chain and top sprocket.
- Adjust chain tensioner using a 4mm Allen wrench and by sliding the tensioner up the sidebar until the front side of the chain has roughly 10-15mm (0.4-0.6in) of give when pressure is applied.
- Replace chain cover. Torque sidebar cover bolts to 8 ft-lb.

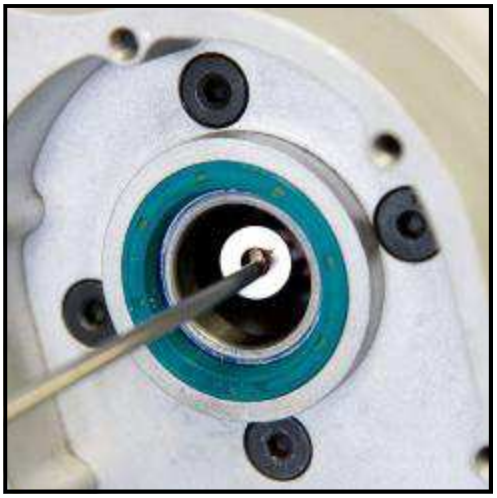
  Note: If cover does not seat on the sidebar, the top sprocket is not fully seated in the bearing.

Disengaged AWD System ——>>> Pull and Push with one finger to Engage. —>>>> Engaged AWD System

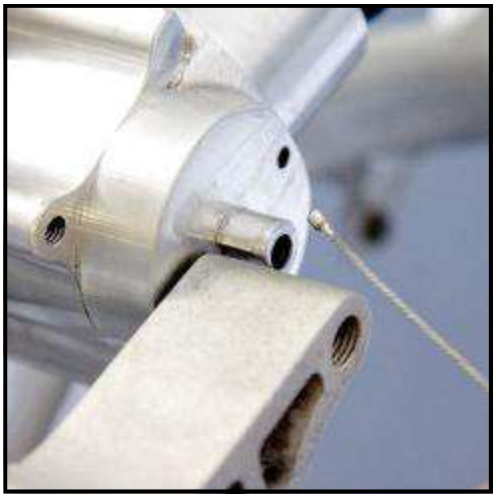


- Grease engagement retaining washer.

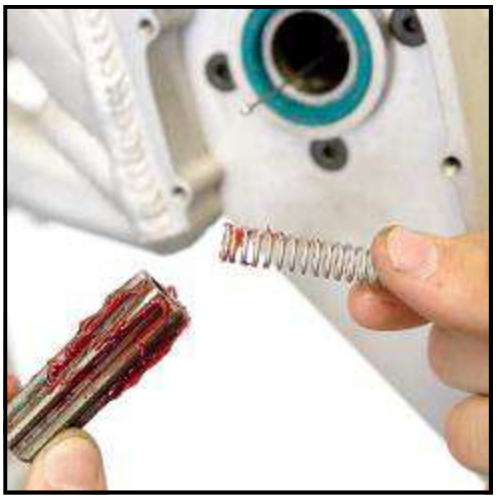
- Insert washer into the back of the gearbox using a pick so it sits flush against the input gear retaining ring.



- Insert the small fitting from the engagement cable through the center hole in the back of the gearbox and feed it through until it sticks out the front of the sidebar.

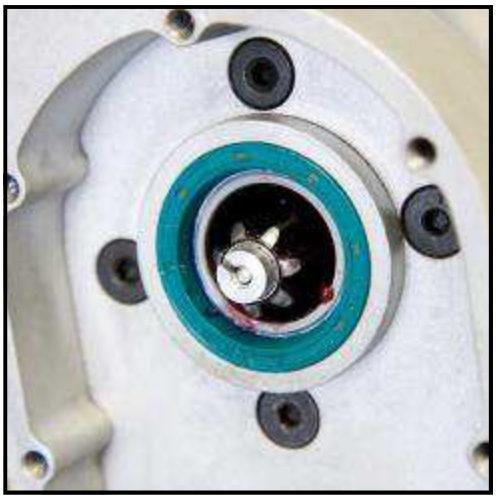


- Grease the engagement spring and spline.



- Feed the engagement cable through the spring and spline.

- Insert the cable fitting onto the end of the cable and seat the fitting into the engagement spline bearing.



- Seat the cable housing into the back of the gearbox.

- Slide the other end of the cable into the engagement switch.

- Line up the engagement spline with the input gear inside the gear-box and push the spline into the gear.

- Position the switch so the lever is positioned towards the rider (on) and slide the housing into the end of the switch.

Note: If there is not enough slack to seat the cable, make sure the engagement spline is pushed all the way into the gearbox and the barrel adjuster on the cable is turned in completely.

- Insert the secondary sprocket into the sidebar and make sure it is fully seated.

- Position the engagement lever towards the rider (on) and turn the barrel adjuster out until the engagement spline just starts to pull away from the stop snap ring.

- Push the lever to the off position. Make sure the secondary sprocket is fully seated. Spin the secondary sprocket to verify that the spline has fully disengaged from the sprocket and it spins freely.

Note: Due to AWD hub design, front wheel removal and installation is aided by removing front caliper first.

- Remove front brake caliper (note: do not squeeze front brake lever while caliper is off.
- Remove axle bolt from axle.

- Loosen axle pinch bolts on both sides of dropout.

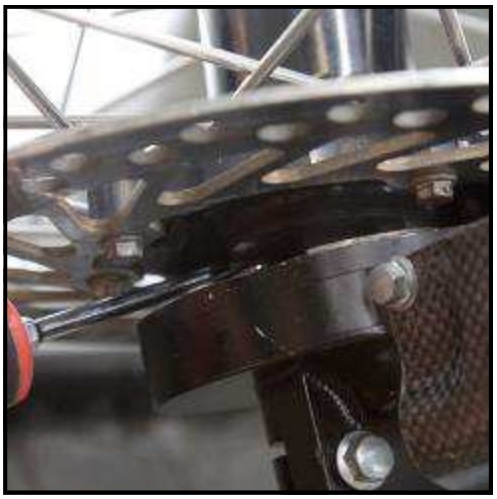
- Slide axle through wheel and remove.

- Remove front wheel from dropouts.

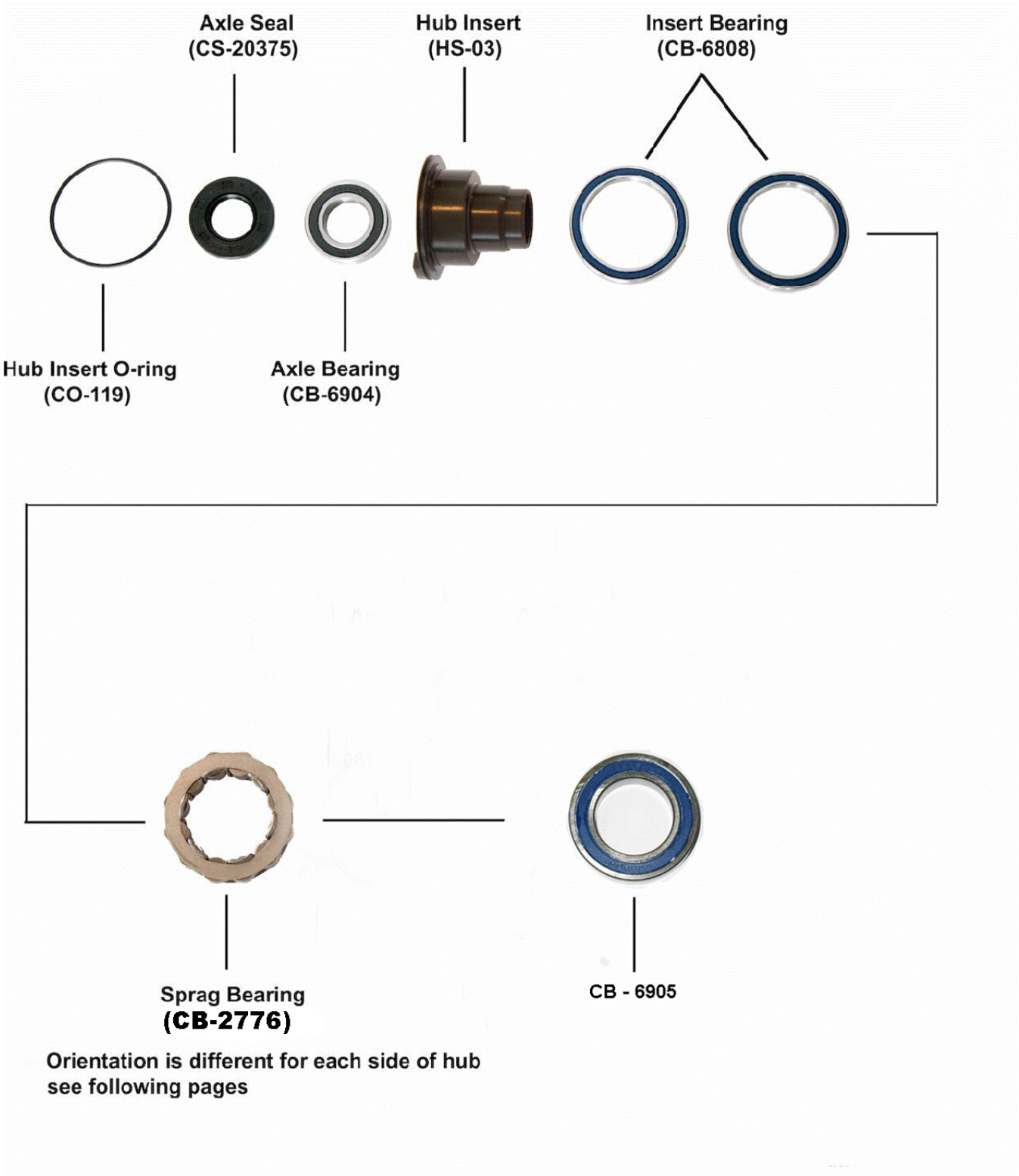
Note: The hub inserts will not fall out like the spacers on a normal hub. They will also rotate independent of each other; this is ok.

Front Wheel Installation

- Lightly grease dropout o-rings and hub seals before installing the front wheel.
- With brake caliper removed, install front wheel into forks by carefully aligning right drive carrier on dropouts with hub inserts. Once the right carriers are seated, slide axle through to other end of hub.
- Carefully align left carriers and slide axle completely through to the other side. Note, a flat blade screw may be needed to align hub insert with drive carrier. Note that the hub inserts will only rotate in one direction in the hub.



- Thread axle bolt back into the end of axle and tighten to 12ft-lb. Tighten axle pinch bolts to 12 ft-lb. **Note:** If wheel does not spin freely, axle bolt is too tight!
- Reinstall front brake caliper.


Axle Seal
(CS-20375)
Hub Insert
(HS-03)
Insert Bearing
(CB-6808)
Hub Insert O-ring
(CO-119)
Axle Bearing
(CB-6904)
Sprag Bearing
(CB-2776)
CB - 6905
Orientation is different for each side of hub
see following pages

Warning: Before taking hub apart, make sure that you have a full set of spare sprag bearings. Sprag bearings are likely to be damaged during the disassembly process and new ones may be required.

- Using a soft punch, remove the hub inserts from either side of the hub.

- Pry the insert seals out of the inserts using a flat bladed screwdriver.

- Remove the hub insert o-rings with a pick.

- Punch the axle bearings out of the inserts using the access holes in the back of the inserts.

- Using a bearing punch, install the axle bearings into the hub inserts.

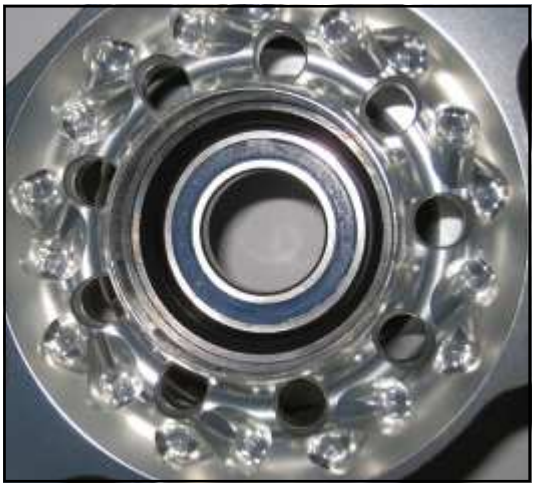
- Press the axle seals into the hub inserts.

- Install the hub insert o-rings.

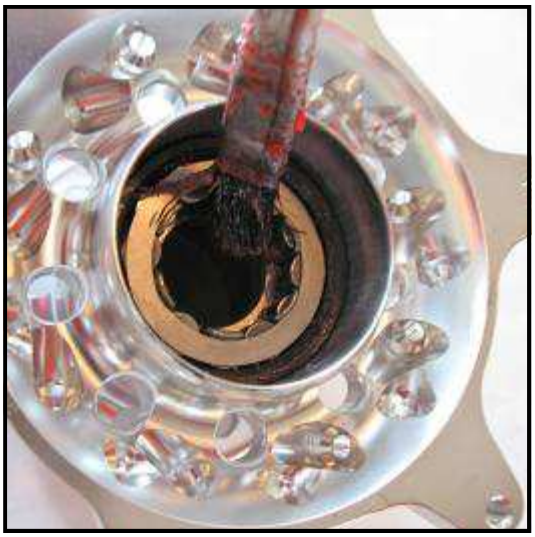
Warning: Sprag bearings must be installed in the correct orientation in the hub for the AWD system to work properly. If the sprag bearings are not installed correctly, the AWD system can be damaged.

- Press CB-6905 bearing into the Hub Inner Race

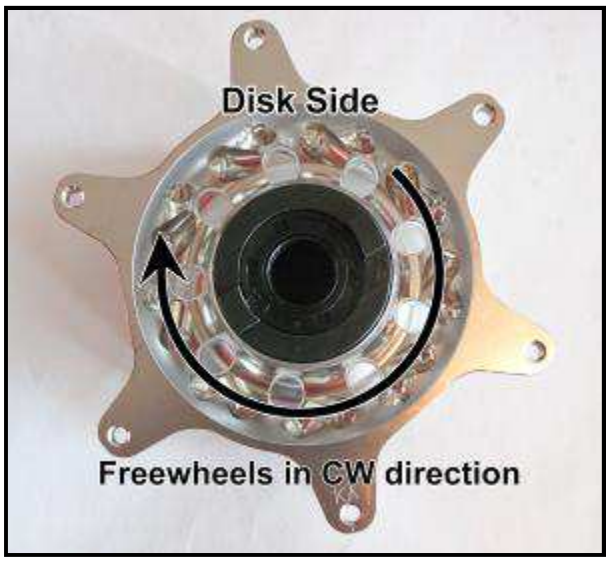
- Be sure that the bearing is seated completely



- Insert sprag bearing into hub shell. (correct direction will be determined in next steps.). Lightly grease inside of sprag bearing with Shell grease.



- Test fit hub insert into hub, twisting as it is inserted.



- **Spin the hub insert and check to make sure it is freewheeling in the correct direction.** If it is not, remove the hub insert and flip the sprag bearing around. Recheck to verify that hub insert freewheels in the correct direction before moving on to next step.

- Remove hub insert and press insert bearings into hub.

- Grease hub insert seal, and slip hub insert into hub. It may be required to tap hub insert into hub with a soft faced hammer.

-
- Grease axle seal.

- Repeat procedure for the other side of hub.

Fork Removal

Warning: If removing forks for rebuild service, the fork dropouts must be disassembled so that the drive system parts are not contaminated during the service.

- Loosen the housing cap from the linear bearing housing and un-screw it completely

- Slide the housing down off the sprocket driveshaft

- Looser top and bottom triple clamp bolts. Be sure to hold fork while loosening bolts so it does not fall out. Slide fork out of triple clamps and remove.

Warning—When fork is off the bike do not apply side pressure to spline shafts as it is possible to bend them if enough force is applied.

- Carefully slide forks into triple clamps.

- Set desired fork height and torque triple clamp bolts to the following:

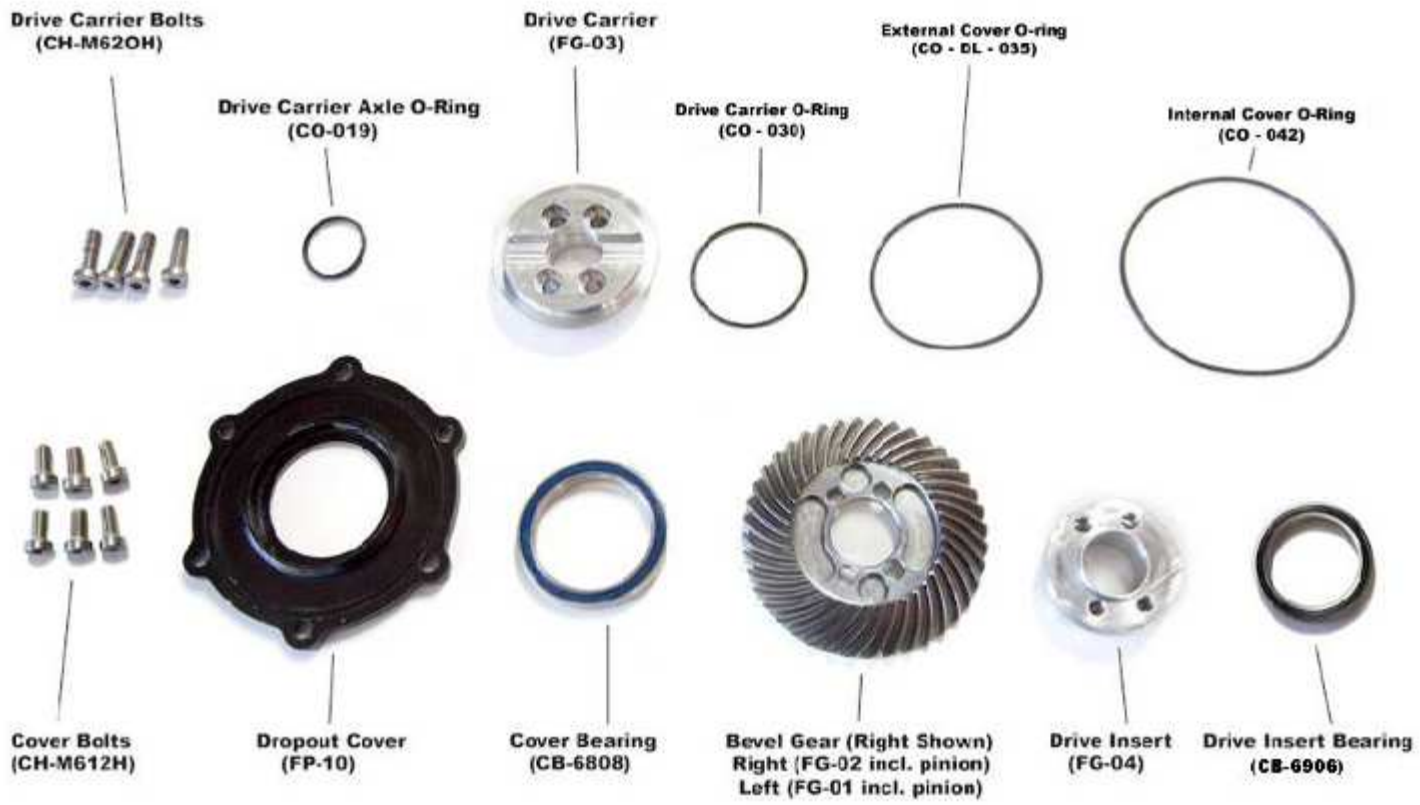
  15 ft-lbs Lower

  17ft-lbs Upper

- Slide the linear bearing housing over the drive sprocket shaft

- Tighten the housing cap down with 2 adjustable wrenches

-



* Angular contact bearing
Black seal must face towards pinion gear!

Dropout Service

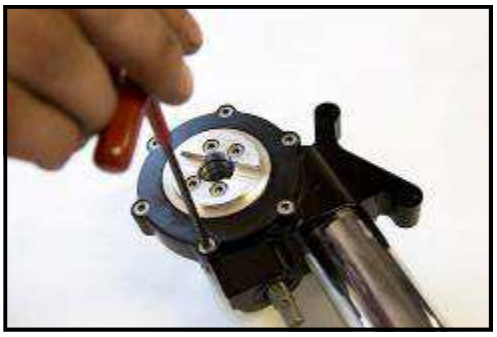
- Remove the front wheel and front fork.

- Remove bellow clamp and bellow from spline driveshaft. Pry gently with small flathead screw driver to undo clasp on clamp. The clamps are not reusable!

- Remove set screw from driveshaft with 2.5mm Allen key.

- Remove driveshaft from pinion gear by lightly tapping lower driveshaft with a plastic hammer while pulling the driveshaft away from the dropout.

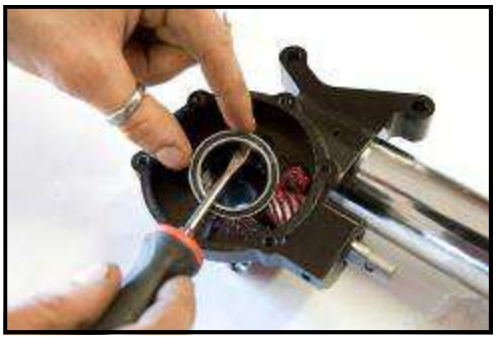
- Remove 6 cover bolts on the outside of the gearbox using a 4mm Allen wrench.



- Rotate the cover and pull it off of the dropout.

Dropout Service

- Remove drive insert bearing from inside of dropout. Bearing is a slip fit so only light pressure from screw driver is required to remove.



- Tap down on pinion gear with plastic face hammer. After pinion is removed, slide the bottom bearing out of dropout bore. If bearing stays on pinion shaft, remove by hand or with split bearing puller. Note: lower pinion bearing is angular contact so if pressure is applied in the wrong direction it may come apart. If bearing comes apart, it must be replaced.

- Remove top driveshaft seal from dropout using small flat blade screwdriver. Be careful not to scratch inner bore.

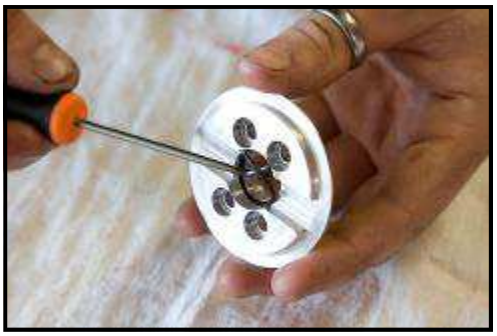
- Remove top pinion bearings from upper bore by tapping them lightly tapping from inside the dropout with non-marring punch.

- Pry axle o-ring from dropout using small pick.

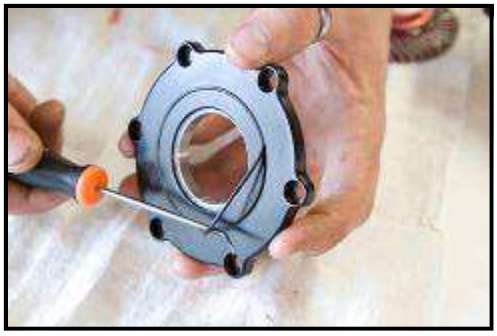
- Remove 4 drive carrier bolts with 4mm Allen wrench. The inner hardened bevel gear can be clamped with soft jaws in a vise or the drive carrier can be held with square bar stock to keep the assembly from moving as you unscrew the bolts.

- Lightly tap the outside face of drive carrier with plastic hammer to break it free from gear and drive insert.

- Remove axle o-ring from drive carrier with pick.



- Remove cover o-rings and drive carrier o-ring.



Dropout Service

- Remove cover bearing with bearing removal punch. Note o-ring lip near inner race of bearing is easily damaged. Only apply pressure to inner race of bearing.

- Remove drive insert from gear with hammer and bearing removal tool.

- Before reassembly of dropouts, all parts must be cleaned and inspected individually for damage or wear. Parts can be cleaned with solution no different then OEM fork. Be sure to blow dry dropouts and parts prior to reassembly if cleaning solution is used.
- Pinion and bevel gear must be replaced as a set.
- If bearings are seized or hard to turn by hand they must be replaced or cleaned and repacked with grease.
- Be sure to grease all o-rings and gears during reassembly.

- Install cover bearing into cover with bearing installation tools.
- Install internal and external cover O-rings. **Note:** all O-rings should be lightly coated with grease before being reassembled.

- Insert drive carrier o-ring on drive carrier and insert drive carrier into cover and tap into place. **Note:** face of drive carrier should be flush with cover bearing and machined cover surface.

- Place drive insert on tooth side of bevel gear and line up all four threaded holes with clearance holes on gear.

- Set cover and drive carrier on top of bevel gear assembly, with smooth side of gear facing the cover. Line up 4 bolt holes and thread drive carrier bolts into drive insert. Blue Loctite should be used on bolts. Final tightening of bolts will require a square bar or soft jaws to keep gear from spinning. Torque bolts to 8ft ft-lbs.
- Check that bevel gear spins freely on cover. If it does not spin freely, check to make sure all o-rings and the cover bearing are properly seated. If new o-rings are used, there may be more friction until o-rings seat and break in.
- Insert axle o-ring into drive carrier.

Dropout Service

Warning: Bevel gears are right and left hand specific and must be installed in the correct dropout or damage to the system can occur. The Left Bevel Gear Set shown below must go in the disk side dropout. Note the difference in the spiral direction on each gear set.

Right Bevel Gear Set
(FG-02)

Left Bevel Gear Set
(FG-01)

Note: Be sure dropout is clean before proceeding

- Insert top pinion bearings and seal into driveshaft bore at top of dropout using bearing driver. Note, be careful not to damage seal or nick chrome fork plating with hammer. Use plastic faced hammer.
- Apply light grease to pinion seal

- Insert bottom pinion bearing onto pinion gear.

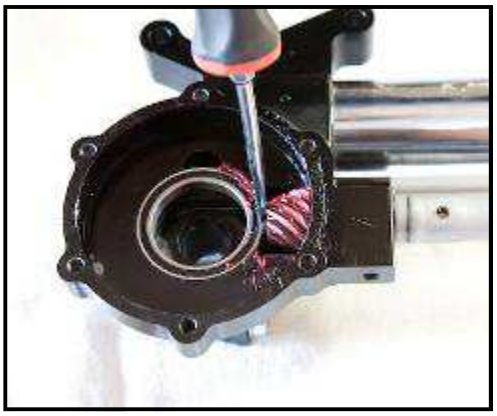
WARNING: black seal must be facing down towards gear teeth. If bearing is not inserted correctly, severe damage can occur!

- Slide bearing and pinion gear into bore. Make sure bearing is fully seated.

- If needed use hammer and soft punch to tap end of pinion gear to seat bearing.

- Insert axle o-ring into dropout.

- Install drive insert bearing and wedge small flat blade screwdriver in between pinion gear and inner bearing to keep pinion gear in place when the splined shaft is installed.



- Slide splined driveshaft onto pinion gear, making sure to line up the set screw holes. Lightly tap end of spline shaft with plastic faced hammer to slide it down onto pinion gear and line up set screw holes.

- Insert set screw with light dab of blue Loctite. When set screw is fully seated, it will be slightly below the surface of driveshaft. If not, make sure that spline shaft is fully seated on pinion gear.

- Grease pinion gear and bevel gear with Shell Lithium grease.
- Insert cover/bevel gear assembly onto dropout.
- Insert 6 cover bolts and tighten in a cross star pattern using a 4mm Allen wrench. Tighten to 8ft-lbs.
- Check that drive carrier spins freely and wipe excess grease from outside of dropout.

- Reinsert bellow and bellow clamp over spline shaft and crimp bellow down using crimping tool or vise grips.

WARNING: The band of clamp must be over the set screw to ensure that the set screw can not back out.

- Lightly grease spline shaft with Shell Lithium grease.

- Reinsert forks into triple clamps.

Sleave Seal
(CS-050)
Housing Sleeve
(FD-09)
Grease Fitting
(FD-11)
Retaining Ring
(CSR-81B)
Housing Felt
(FD-10)
Linear Bearing
(CB-LSAG12)
Housing Cap
(FD-08)
Cap O-ring
(CO-116)
Cap Snap Ring
(CSR-75B)
Linear Bearing Housing
(FD-07)

- Cut Black Zip Tie from boot and slide it off the housing.

- Remove forks from triple clamps (see “Fork Removal” section).

- Slide housing assembly off of linear driveshaft.

- Unscrew grease port from linear bearing housing.
- Remove set screw from housing.

- Slide housing sleeve off of housing.

- Remove linear bearing retaining ring.

- Slide linear bearing out of housing and inspect. If ball bearings inside of the case are corroded or worn, replace linear bearing.

Warning: Do not use hammer and punch to remove bearing as it may damage the bearing. If bearing will not slide out apply pressure to the bearing lip with an 8mm nut driver to remove it.

- If shaft seal is damaged or worn, pry it out and replace it with a new seal.

- Remove felt from housing sleeve and inspect. If needed, replace felt.

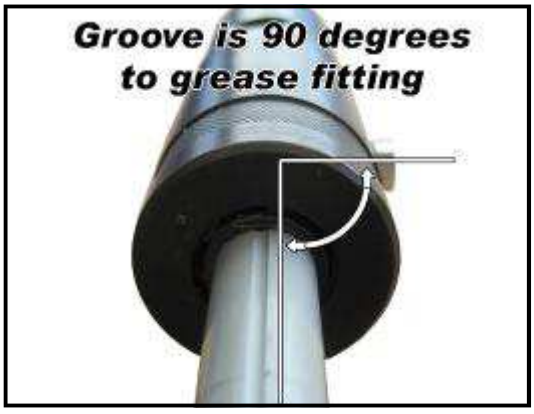
Note: Dirt will pack up in felt. The felt can be cleaned and reused.

- Saturate felt with gear oil and place it back in housing sleeve.

- Reassembly of linear bearing housing is the reverse of disassembly.

Warning: Use red Loctite on grease fitting or it may back out and cause the housing sleeve to slide down while riding.

Warning: When sliding linear bearing housing back unto driveshaft, carefully align the ball bearings with the grooves in the driveshaft. Do not force the housing onto the driveshaft. Groove should be approximately 90 degrees to the grease fitting.

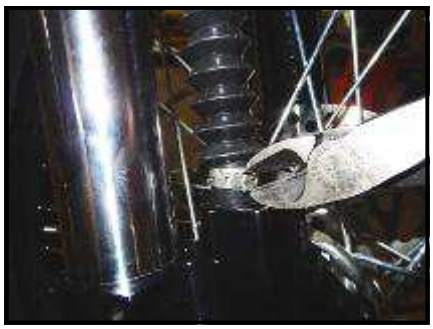


Boot Replacement

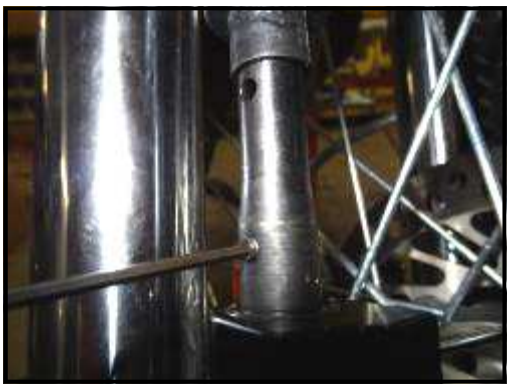
Note: To remove and replace the drive shaft boots, it is not necessary to remove the forks. The service can be done by removing the fork guards and following the instructions below.

- Remove Fork Guard

- Remove upper and lower boot clips with wire cutters



- Pull up boot and loosen drive shaft set screw



- Insert screw drive in vent holes and tap up on screwdriver.

- Slide shaft upwards. **Note: Do not slide shaft down and remove from linear bearing.**

- Remove old boot and slide new boot onto driveshaft.

- Add a new clip on the bottom of the shaft.
- Insert driveshaft onto pinion gear and tighten set screw.
- Slide boot over bottom section of shaft and install set screw.

- Crimp the clamp around the boot and set screw.

- Pull top of boot over linear bearing housing and secure with low profile zip tie.
- Reinstall the fork guard.

Triple Clamp Removal

Note: To service the triple clamp chains, sprockets and bearings it is recommended that you leave the bottom triple clamp attached to the bike. This will make it easier to pull the cover off. For servicing the steerer tube bearings, or replacing the head tube gears, the triple clamps will need to be removed.

- Remove forks and front fender from triple clamps.

- Loosen the two preload bar pinch bolts.

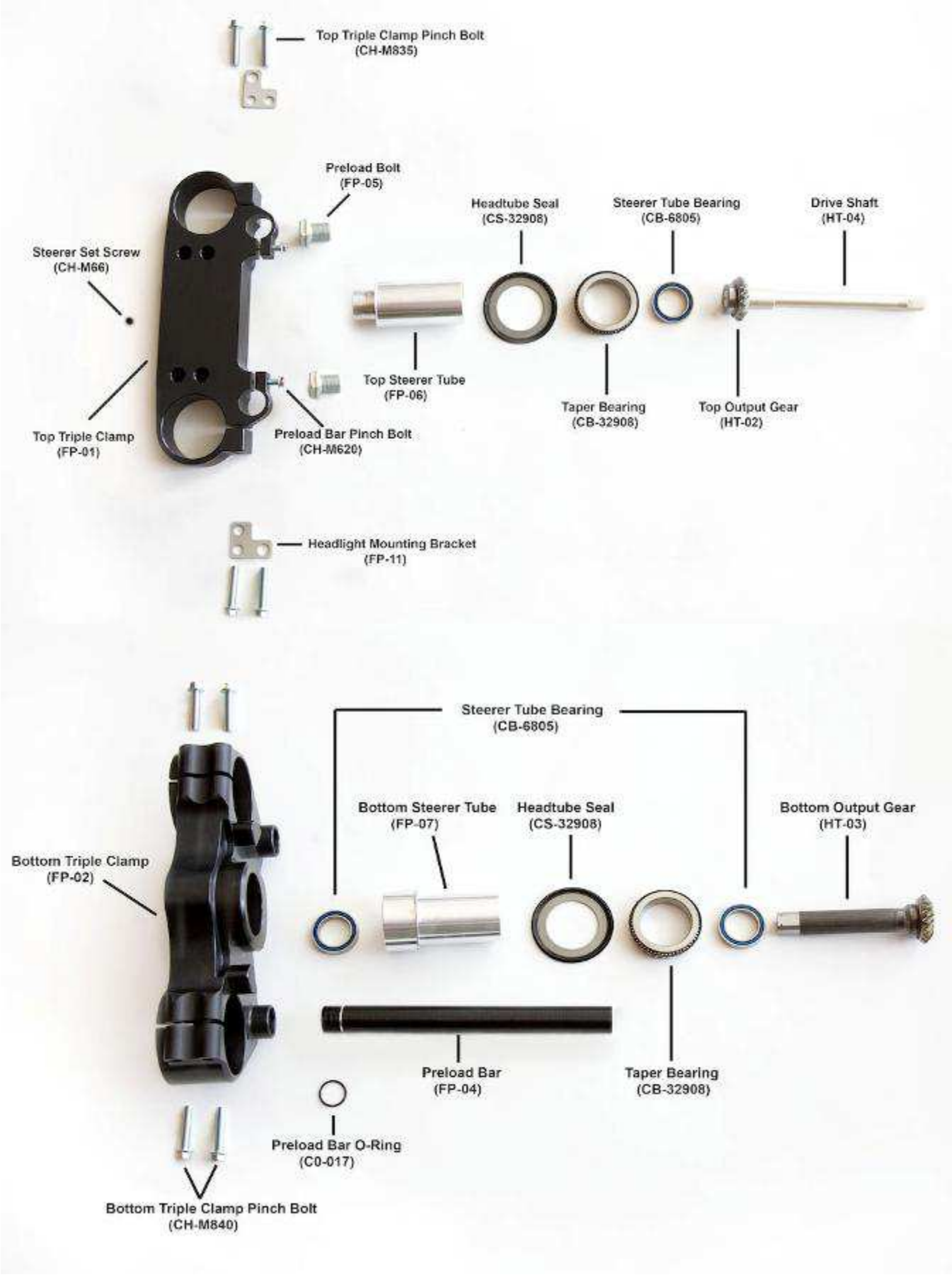
- Remove the preload bolts with a 22mm Wrench.

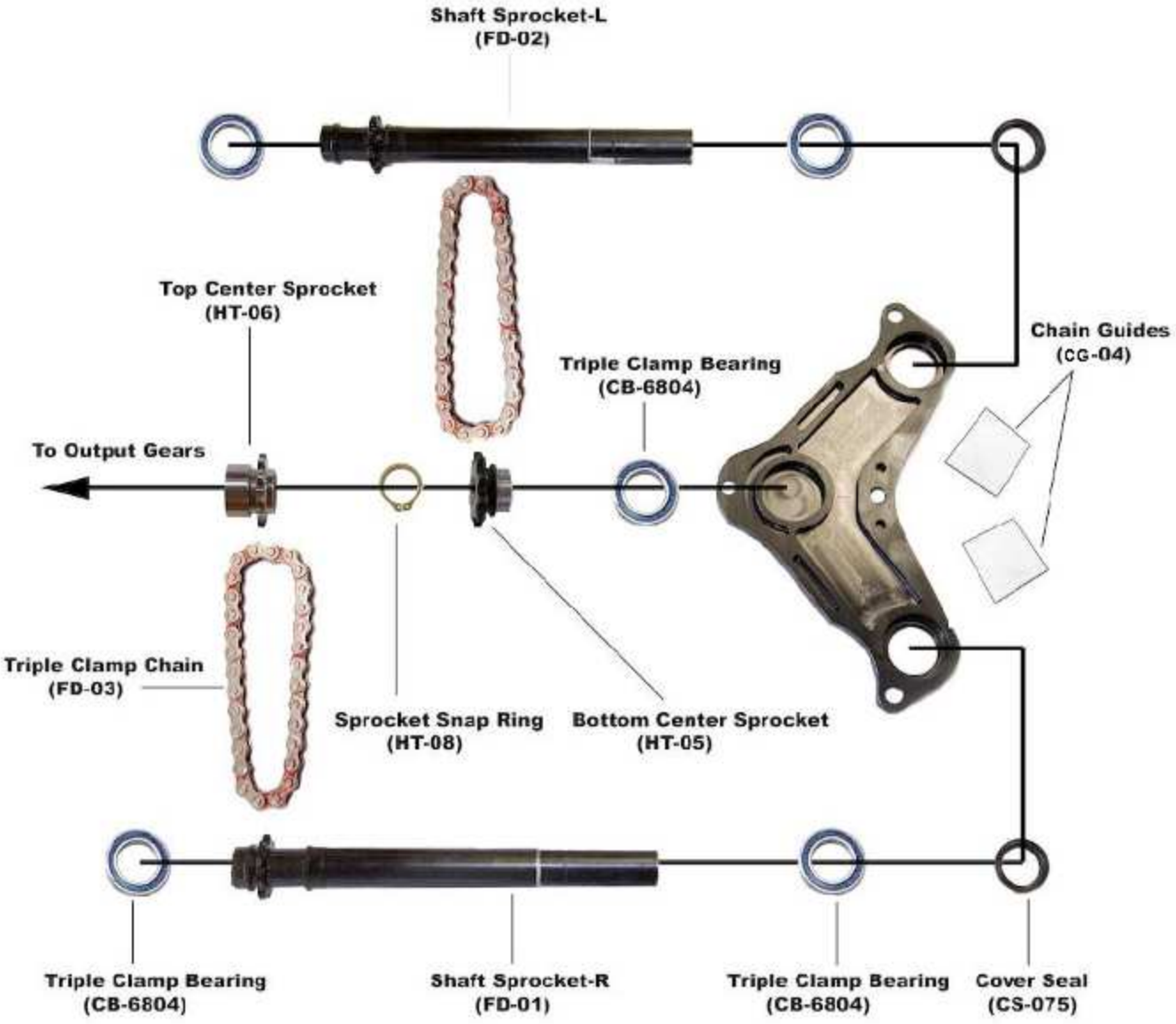
- With a plastic faced hammer, tap the bottom triple clamp to unseat it from the frame.

- Slide the bottom triple clamp out of the frame.

- Pull the top triple clamp assembly out of the frame.

Note: It may be necessary to tap the underside of the top triple clamp with a plastic faced hammer to unseat it from the frame.

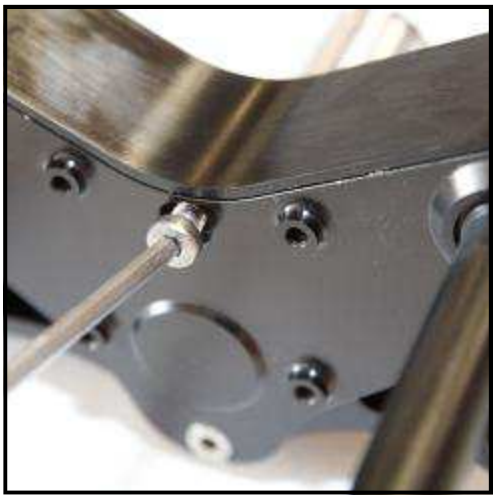

Top Triple Clamp Pinch Bolt
(CH-M835)
Preload Bolt
(FP-05)
Headtube Seal
(CS-32908)
Steerer Tube Bearing
(CB-6805)
Drive Shaft
(HT-04)
Steerer Set Screw
(CH-M66)
Top Steerer Tube
(FP-06)
Taper Bearing
(CB-32908)
Top Output Gear
(HT-02)
Top Triple Clamp
(FP-01)
Preload Bar Pinch Bolt
(CH-M620)
Headlight Mounting Bracket
(FP-11)
Steerer Tube Bearing
(CB-6805)
Bottom Steerer Tube
(FP-07)
Headtube Seal
(CS-32908)
Bottom Output Gear
(HT-03)
Bottom Triple Clamp
(FP-02)
Preload Bar
(FP-04)
Taper Bearing
(CB-32908)
Preload Bar O-Ring
(C0-017)
Bottom Triple Clamp Pinch Bolt
(CH-M840)


Shaft Sprocket-L
(FD-02)
Top Center Sprocket
(HT-06)
Triple Clamp Bearing
(CB-6804)
Chain Guides
(CG-04)
To Output Gears
Triple Clamp Chain
(FD-03)
Sprocket Snap Ring
(HT-08)
Bottom Center Sprocket
(HT-05)
Triple Clamp Bearing
(CB-6804)
Shaft Sprocket-R
(FD-01)
Triple Clamp Bearing
(CB-6804)
Cover Seal
(CS-075)

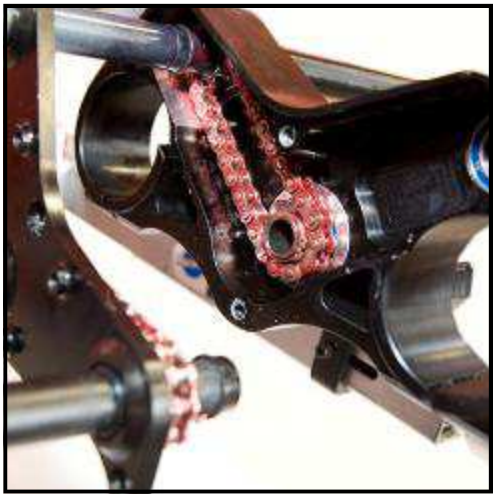
Triple Clamp Service

Note: To service the triple clamp chains, sprockets and bearings it is recommended that you leave the bottom triple clamp attached to the bike. This will make it easier to pull the cover off. For servicing the steerer tube bearings, or replacing the head tube gears, the triple clamps will need to be removed. For picture clarity, the triple clamp was removed from the bike.

- Remove the forks and spline bearing assembly.
- Remove the 4 cover bolts from the bottom of the triple clamp with a 6mm Allen wrench.



- Carefully pull on the shaft sprockets and ease the cover down from the bottom triple clamp. The Left shaft will pull down with the cover. The right shaft will stay in place and the cover will slide down over it.



- Remove the right shaft sprocket and the chain inside of triple clamp cavity.

- Pull center bottom sprocket off of the cover and remove the chain.

- Pull both shaft sprockets out of cover. Be careful of seal as it slides over snap ring grooves as it can tear the seal.

- Remove cover bearings from cover with bearing puller if they need to be replaced.

- Remove cover seals and inspect. Replace if needed.

- Remove sprocket snap ring .

- Remove sprocket and gear by tapping the gear through the sprocket with a plastic faced hammer and pulling it out the top of the steerer tube.

- Remove gear from steerer tube. If bearing comes out with gear, remove bearing from gear with split bearing puller if it does not slide off easily.

- If top bearing remains in steerer use a punch to remove it.

- Tap the bottom output bearing from the bottom steerer tube.

- Inspect gears and bearing and replace any parts if needed.

Note: Head tube gears must be replaced in sets.

Warning: Replacing the taper bearing is a job for your dealer. Do not attempt to do this on your own.

- Remove the preload bars from the bottom triple clamp.

- Press the steerer tube out of the bottom triple clamp with an arbor or hydraulic press. The steering stops should be supporting the triple clamp as the steerer is pressed out.

- Press the taper bearing and seal off of steerer tube with an aluminum sleeve available from Christini.
- Press new taper bearing and seal onto steerer tube.
- Coat mating surface of triple clamp and steerer tube with green Loctite.
- Press steer tube into triple clamp.

- Press steerer bearing into the top of the steerer tube.

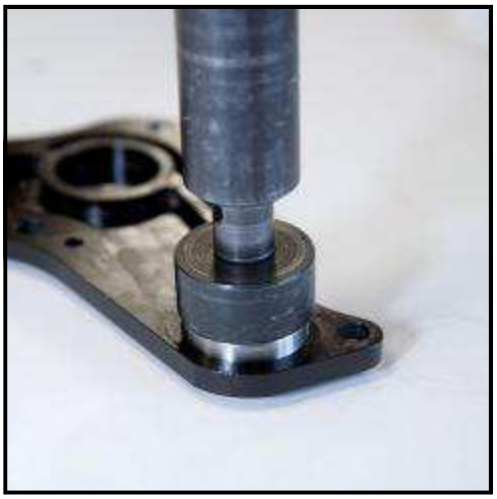
- Press steerer bearing into bottom of the steerer tube.

- Install bottom output gear and tap sprocket back onto bottom of gear using a plastic faced hammer. Sprocket is fully seated when the end of it is flush with the snap ring groove.

- Replace snap ring.

- Install cover seals.

- Press cover bearings back into outer bores of cover.



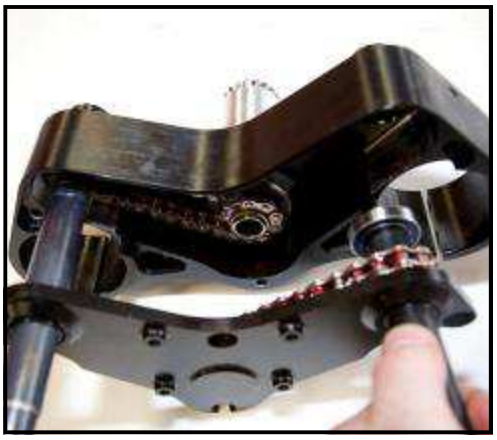
- Insert Teflon chain guides into cover if they were removed. Note the wear pattern and be sure that the guides are placed on the same side as they were removed from.

- Insert triple clamp bearing onto top of the right shaft sprocket. It will be a slip fit.
- Wrap chain around top center sprocket and right shaft sprocket.
- insert shaft sprocket and bearing into bearing bore on triple clamp. It will be a slip fit.

- Insert triple clamp bearing onto bottom center sprocket.
- Push left shaft sprocket through cover.
- Wrap the chain around the left shaft sprocket and bottom center sprocket.
- Insert bottom center sprocket with bearing into the center cover hole.
- If needed, grease chains with Shell grease.

- Slide cover and left shaft sprocket up into bottom triple clamp until the cover meets flush the lip of the bottom triple clamp. If needed use a small screwdriver or pick to push the right chain away from the Teflon block as the cover slides into place.

Hint: once the cover makes contact with the bottom triple clamp, rotate the shaft sprockets as you are pushing the cover into its final position. This helps to line everything up correctly.



Warning: Left and right shaft sprockets must be installed on the correct side or severe damage to the AWD system can occur. A simple rule to remember is that the lower shaft sprocket goes on the rider's left side (ie: Left=Low).

- When cover is in place screw down the cover bolts with a 6mm Allen wrench.

Note: Use blue Loctite on cover bolts. Torque bolts to 12 ft-lbs

- Pull top output gear and bearing out of top steerer. If bearing does not come out with gear, use blindside bearing puller to remove the bearing

- If bearing is seized or hard to turn by hand, it should be replaced.

- Inspect output gear for wear. If it needs to be replaced, **all gears in the head tube must be replaced at the same time.**

Warning: Replacing the taper bearing is a job for your dealer. Do not attempt to do this on your own.

- Loosen steerer set screw in triple clamp and remove the steerer tube.

- Press taper bearing and seal off of steerer tube with an arbor or hydraulic press.

Note: A new seal will be needed as it will be damaged when the taper bearing is pressed off the steerer.

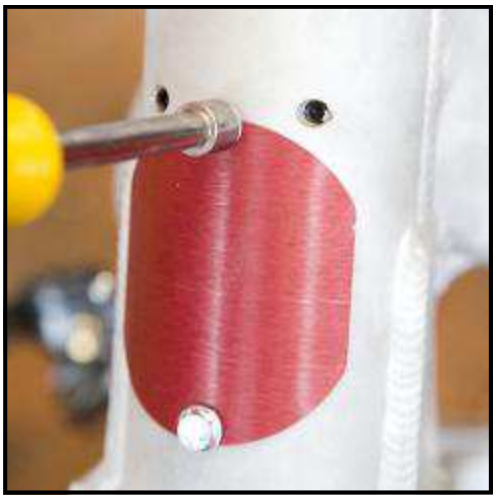
- Press new taper bearing and seal onto steerer tube.

- Insert steerer tube into top triple clamp and tighten set screw to secure steerer tube.

- Slide the steerer tube bearing back onto the output gear.

- Press gear and bearing into top steerer tube.

- Remove triples clamps as previously described.
- Remove the head tube cover from the front of the head tube.

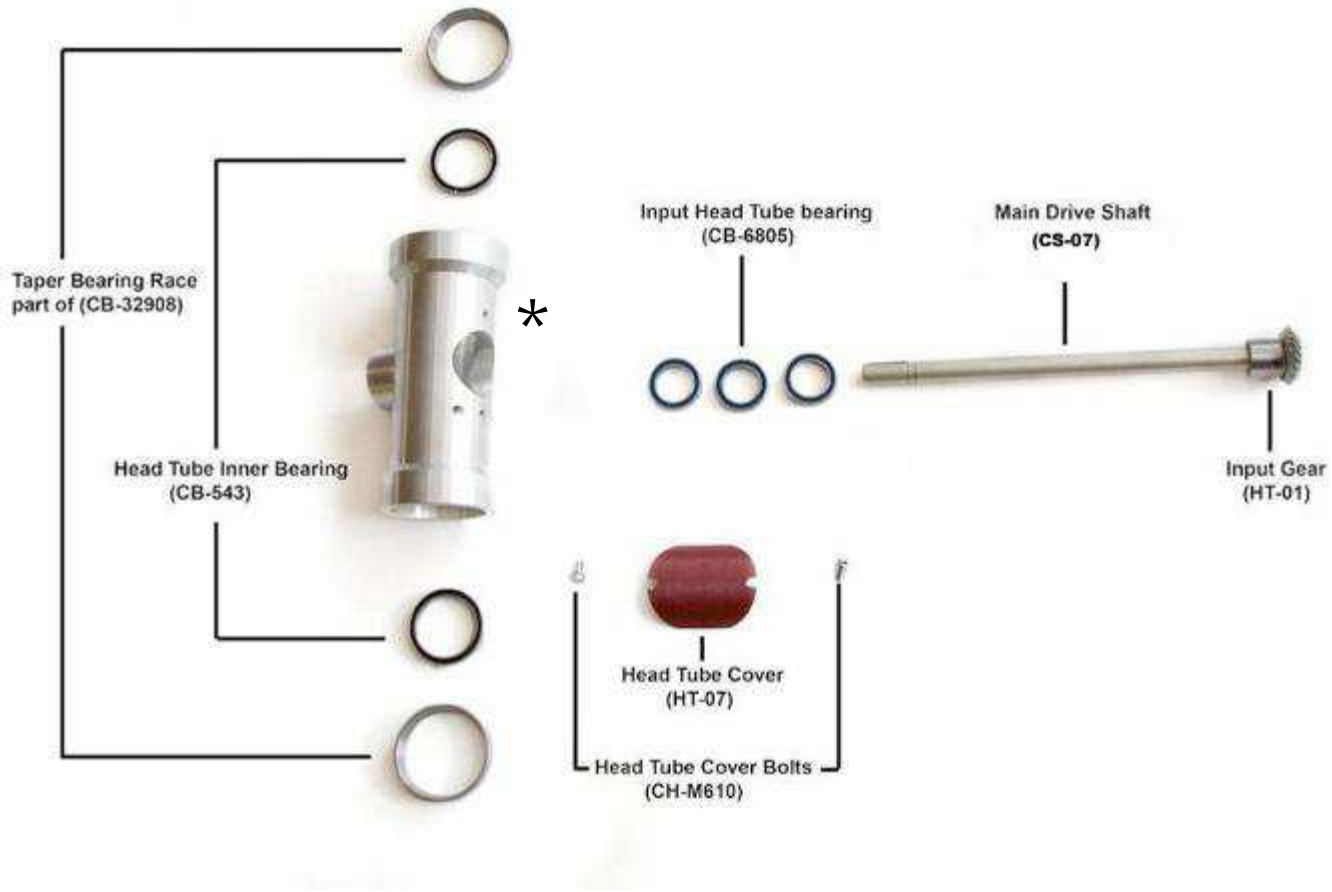


- Slide the input head tube gear and main driveshaft out the head tube access port. The driveshaft will need to slide out of the clutch hub.

- If the 3 input bearings do not come out with the input gear and need to be replaced, gently tap them out with a punch. Make sure they do not get cocked as they are being tapped out.

Warning: If any of the head tube gears are damaged and need to be replaced, all of the head tube gears must be replaced together as a set.

Head Tube Bearing Service



* Picture above shows a head tube not welded to the frame for reference.

- Use a punch and remove the inner B543 bearings.

- If the taper bearing races are corroded or pitted, remove them with a punch.

- Clean the headset bearing surfaces with degreaser and apply a few drops of green Loctite.

- Install the inner B543 bearings using a bearing punch.

- Install the taper bearing races using a bearing punch.

- Slide the input bearings onto the head tube gear.

- Slide the driveshaft partially through the frame and install the clutch hub. **Be sure the clutch retaining snap ring is on the driveshaft before sliding the clutch hub onto the driveshaft.**

- Slide the driveshaft the rest of the way through the frame, seating the input bearings and gear in the head tube and the clutch hub with the clutch basket. Use a soft punch and lightly tap the gear to be sure it is fully seated.

- Move the clutch retaining snap ring into the groove closest to the clutch hub.

Triple Clamp Installation

- Grease the top and bottom taper bearings with Spectro SPL or equivalent waterproof grease. Grease output gears with Shell grease.
- Check to make sure input head tube gear and bearings are completely seated in the back of the head tube.

- Slide top triple clamp assembly into the head tube.
- Before seating the top triple clamp assembly, make sure the output gear and input gear are beginning to mesh correctly.

Note: If the two gears are not meshing, it will not be possible to seat the top triple clamp correctly.

- Tap the top triple clamp with a plastic faced hammer to seat it completely.

Triple Clamp Installation

- Slide the bottom triple clamp into the head tube. **Note: Make sure bottom output gear is meshing with the input gear before fully seating the bottom triple clamp.**

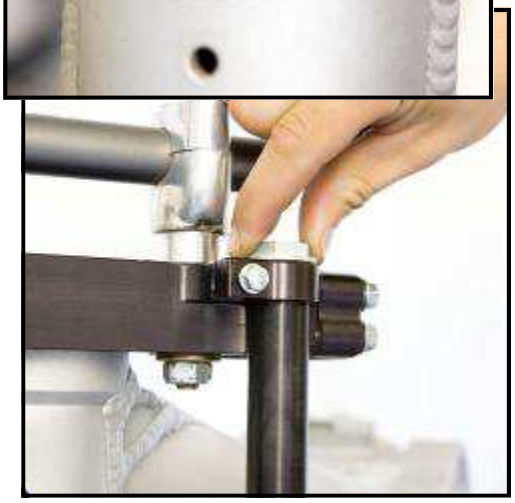
- Once gears are meshing correctly, tap triple clamp with soft faced mallet to fully seat.

- Slide top triple clamp into head tube, aligning preload bars.

- Spin the left side sprocket driveshaft to align the bottom center sprocket (located inside the cavity) with the steerer driveshaft. Once turning the sprocket driveshaft also turns the top output gear, everything is aligned correctly.

- Ensure the top output gear is meshing with the back input gear and tap top triple clamp into place with soft faced mallet until it is fully seated.

- Screw the preload bolts down until they are flush with the top triple clamp.



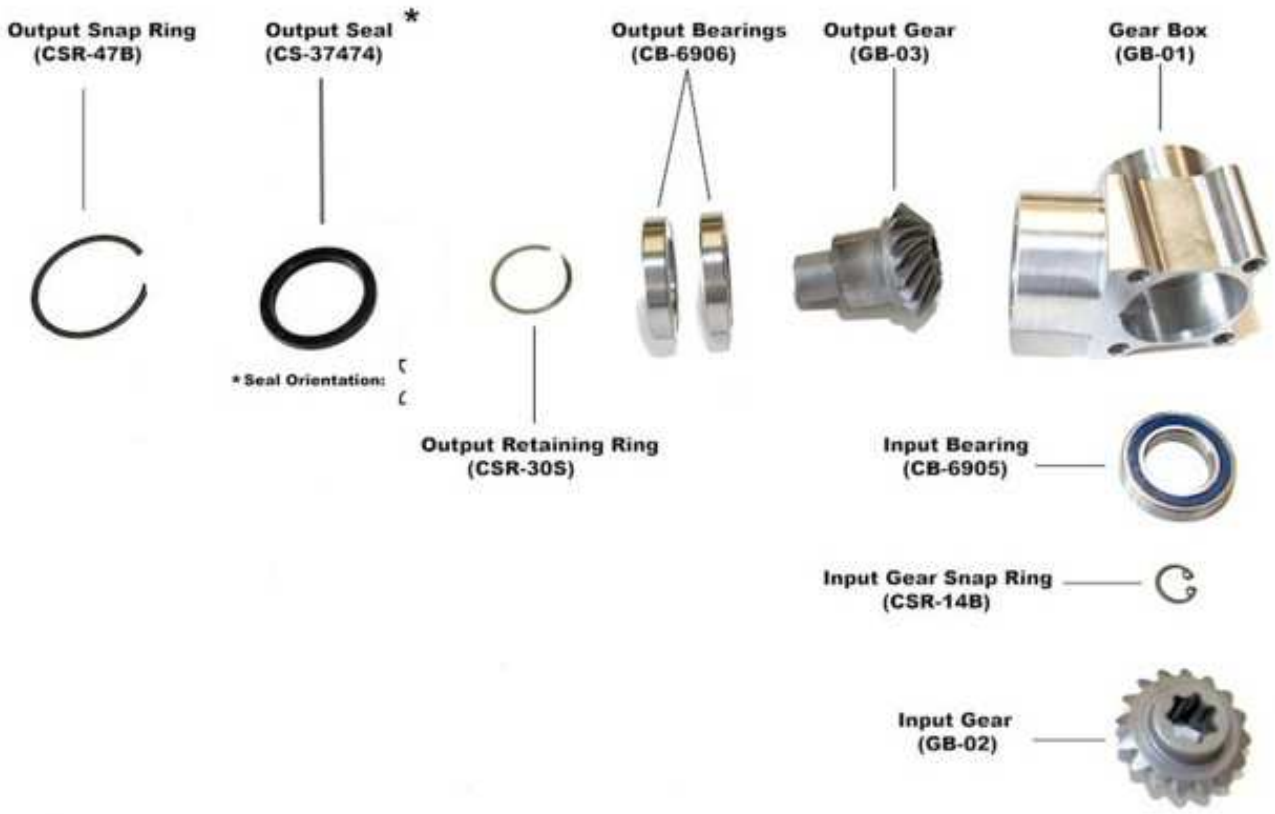
Triple Clamp Installation

- Turn the preload bolts evenly until there is no play in the head tube bearings (usually 1/2-3/4 of a turn).

- Tighten the preload bar pinch bolts.

- Remove chain cover, chain and sprocket from frame (see “Cover/ chain removal” section).
- Remove cable and engagement spline from gearbox (see “AWD engagement cable” section).
- Slide clutch retaining snap ring up main drive shaft 6 inches or more.

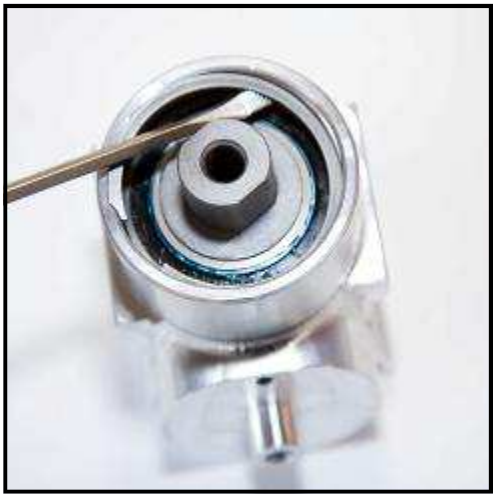
- Slide clutch hub assembly up main driveshaft unit it clears the clutch basket.
- Remove 4 shoulder bolts from sidebar with 4mm Allen wrench.
- With Shoulder bolts removed, slide gearbox out of frame.


Output Snap Ring
(CSR-47B)
Output Seal *
(CS-37474)
* Seal Orientation:
Output Retaining Ring
(CSR-30S)
Output Bearings
(CB-6906)
Output Gear
(GB-03)
Gear Box
(GB-01)
Input Bearing
(CB-6905)
Input Gear Snap Ring
(CSR-14B)
Input Gear
(GB-02)

- Slide clutch basket off output gear.

- Remove output seals from gear box.

- Remove output snap ring.



- Slide output gear and bearings out of gearbox.

- Remove input gear and bearing from gearbox by tapping them out through the access holes in the back of the gearbox.

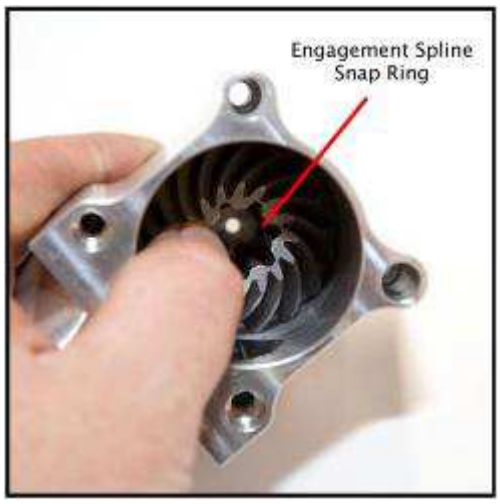
- Remove output retaining ring.

- Use split bearing puller to press output bearings partially off of the gear. After the bearings move away from the gear, use press to remove bearings completely.

- Use same steps to remove input bearing from input gear.
- Inspect gears and bearings and replace if needed.
- Carefully press new output bearings onto driven gear and replace retaining ring.
- Carefully press input bearing onto drive gear and replace engagement spline snap ring if it was removed.

Note: Make sure engagement spline snap ring is install on input gear before it is pressed into the gearbox

- Press input bearing onto gear and insert gear and bearing into gearbox.



- An aluminum punch and hammer may be needed to gently tap input bearing and drive gear back into place. Make sure bearing is fully seated at the back of the gearbox.

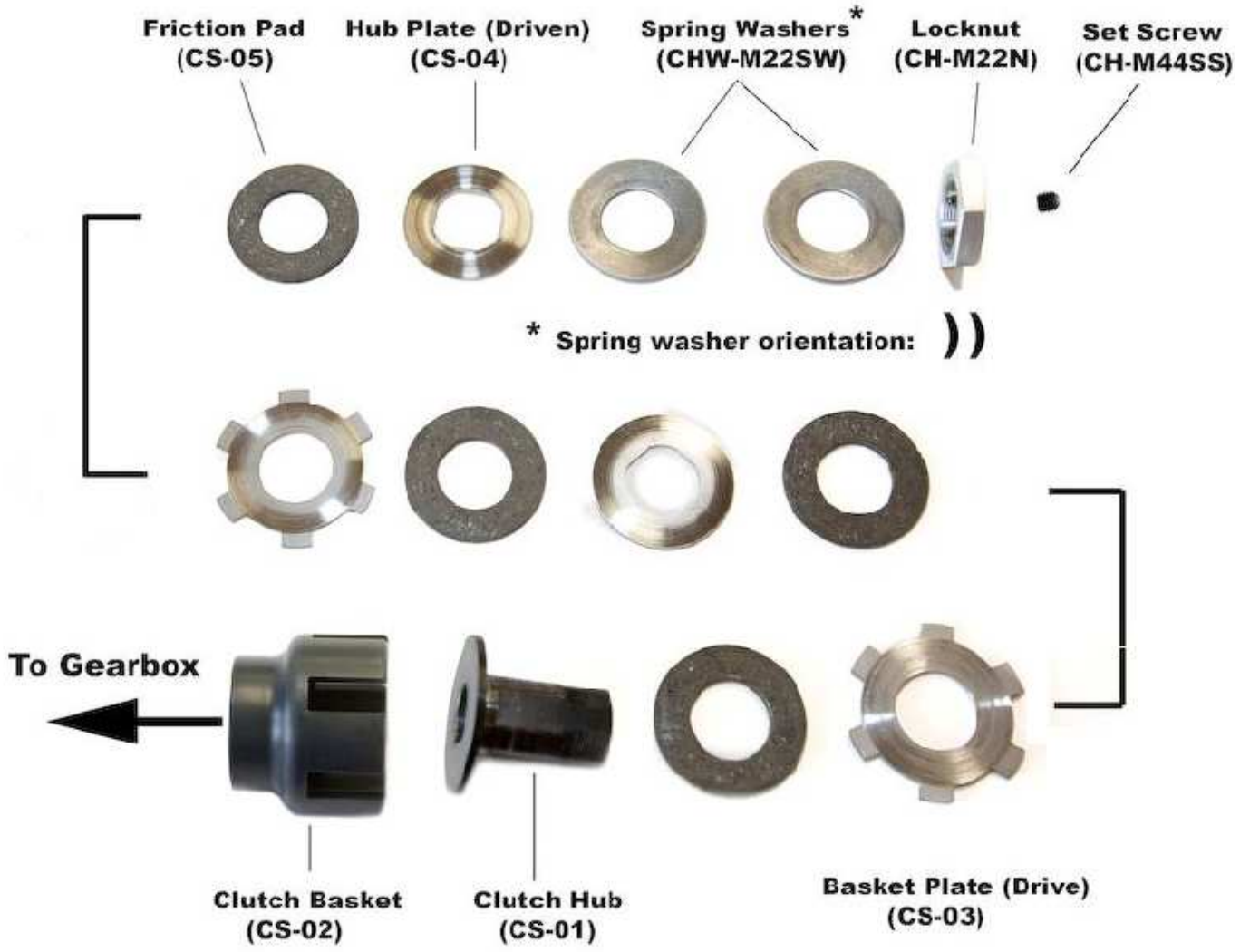
- Insert output gear and bearings into gearbox. Make sure gears mesh correctly as you are pushing the output gear into place.
- Reinstall output snap ring.
- Grease input and output gears using Shell Lithium grease.
- Install output seals into gearbox making sure seals are installed markings facing out.
- Grease lip of seals and push clutch basket back onto output gear.
- Clean any excess grease off of clutch basket.

- Remove chain cover and AWD chain (see “Cover/chain removal” section).
- Slide clutch snap ring up main driveshaft.

- Slide clutch up main driveshaft away from clutch basket.

- Remove 4 shoulder connect gearbox from sidebar.

- Move gearbox out of the way.
- Slide clutch off main driveshaft.


Friction Pad
(CS-05)
Hub Plate (Driven)
(CS-04)
Spring Washers*
(CHW-M22SW)
Locknut
(CH-M22N)
Set Screw
(CH-M44SS)
* Spring washer orientation:
To Gearbox
Clutch Basket
(CS-02)
Clutch Hub
(CS-01)
Basket Plate (Drive)
(CS-03)

- Loosen locknut set screw so it will not interfere with the hub threads.

Warning: Failure to loosen set screw will damage threads in clutch hub.

- Loosen locknut while clutch assembly is still on main driveshaft. To keep driveshaft from spinning apply front brake and put bike in gear.
- Remove clutch assembly from bike (see “Clutch Removal” section).

- Completely unscrew locknut. Remove spring washers, fiber pads and clutch plates and inspect for wear or damage.

Note: If metal plates are not scored or warped, they do not need to be replaced. Simply replace fiber plates during standard rebuilt.

- Reassemble clutch hub noting the order of the plates, fibers and spring washers. Be sure the spring washers are in the correct orientation:

))

- Apply anti seize compound to hub thread and thread locknut onto the hub by hand. **Note:** Use thread file to clean galled hub threads if needed.

- Reinstall clutch on bike.
- Reinstall clutch basket and gearbox.
- Tighten locknut until it is approximately flush with the hub.

- Check clutch settings and adjust as necessary (see “AWD Clutch Test” section).

- Adjust locknut so set screw hole lines up with the nearest flat section on the hub, and tighten set screw.

Warning: Once set screw is tightened, do try to turn locknut as this will damage the hub threads.

Problem	Solution
Front forks feel sticky	• Clean and lube fork seals. • Check to make sure forks are not twisted in triple clamps. • Lube front spline shafts with grease. • If this does not help, pull down dust boot and check spline shaft for damage. • Disassemble spline and check bearing for corrosion and damage. • Make sure front wheel axle bolt is not too tight and is not binding forks
Front wheel is not pulling	• Make sure engagement switch is turned on and the engagement spline is functioning properly. • Check clutch setting for proper torque using “wheel check method”.
Drive system is pulling to one side	• Perform “Sprag bearing test” as described in manual • Check sprag bearings in hub to make sure neither side is slipping. • Make sure that drive shafts are free to spin smoothly. Occasionally mud or other debris can hinder one driveshaft from spinning at the proper rate.
Clutch Basket has notches in it.	• This is normal. As long as the notches don’t exceed 3/16”, Replacement is not needed.
Cannot disengage system	• With bike in neutral rock it back and forth and use the lever to disengage the system. • Engagement cable has too much slack in it. Use barrel adjuster to take slack out of cable.

CHRISTINI AWD LIMITED WARRANTY

This LIMITED WARRANTY is a complete and exclusive statement of CHRISTINI's obligations to the ORIGINAL OWNER of a CHRISTINI AWD Motorcycle Kit.

CHRISTINI Technologies warrants:

-The CHRISTINI AWD 450DS (Dual Sport) street legal version **for a period of 6 months** from the date of purchase for the Original Owner.

-All other original **CHRISTINI AWD components**, including the fork machined parts, front hub, gear box, and the components of the CHRISTINI All Wheel Drive (AWD) system including shafts and drive gears are warranted to be free of defects in material and workmanship **for a period of ONE (1) year** from the date of Purchase for the Original Owner.

OTHER ORIGINAL COMPONENTS

Any components not produced by CHRISTINI, including the front suspension fork internal mechanisms, bear their original manufacturer's own warranty and CHRISTINI reserves the right to direct any warranty request relating to those Other Original Components to said manufacturer's customer service department.

THESE WARRANTIES DO NOT COVER:

- Failures or required services which are not due to a defect in material or factory workmanship.
- Replacement of expendable maintenance items including, but not limited to:
- Bearings, including linear bearing
- Seals and O-Rings
- AWD Clutch Basket, Plates, and Friction Plates
- Shaft Bellows
- AWD Engagement cable and housing
- Sprockets and Drive Chains
- Parts or accessories affected or damaged by:
- Normal wear
- **Finish, including frame, anodized machine parts, and coatings on gears, sprockets and driveshafts**
- Improper maintenance including improper clutch settings
- Lack of proper maintenance
- Improper installation
- Deterioration from exposure to the elements
- The unauthorized alteration of any part
- The incorporation or use of unsuitable attachments or parts
- Unsuitable use in an application for which the part was not designed
- Neglect
- Misuse
- Abuse
- Vandalism

Failures caused by or related to any modification not approved by Christini Technologies, Inc.

- Failures caused by or related to any installation of any parts or kits designed for "competition only" use
- Use for the following activities: which will VOID these warranties:
    - Racing
    - Competition
    - Rental

LIMITED REMEDY

Unless otherwise provided, the sole remedy under the above warranty or any implied warranty is limited to the replacement of defective parts with those of equal or greater value at the sole discretion of CHRISTINI. No cash refunds will be offered under this warranty and you will be responsible for labor costs associated with warranty replacements. IN NO EVENT WILL CHRISTINI AWD BE RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT PRODUCTS LIABILITY, INCLUDING, WITHOUT LIMITATION, PERSONAL INJURY DAMAGES, PROPERTY DAMAGE, OR ECONOMIC LOSSES.

Note: In those states that do not allow the exclusion or limitation of incidental or consequential damages, the above limitation or exclusion may not apply to you.

EXCLUSIONS

The above warranty, or any implied warranty, does not cover normal WEAR AND TEAR, and all warranties are void if the motorcycle is used for other than normal activities, including, but not limited to, the failure to follow the directions for assembly, the instructions, warnings and advice found in the owner's manual or using the motorcycle for commercial activities or in competitive events, including off road racing, motocross racing, stunt riding, ramp jumping or similar activities and training for such activities, or events. This warranty does not cover any damage, failure, or loss caused by accident, misuse, abuse, neglect, improper assembly, improper maintenance, or use of parts or devices not consistent with the original intent for the product sold.

CHRISTINI TECHNOLOGIES MAKES NO OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED. ALL IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED, IN DURATION TO THAT OF THE EXPRESS WARRANTIES STATED ABOVE. Some states do not allow limitations on how long an implied warranty lasts so the above limitation may not apply to you. The warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

WHAT YOU SHOULD DO

Always wear a helmet while riding. Please remember to always ride safely and in control and within your capabilities and limitations. Even under normal riding, motorcycles can be dangerous due to changing and variable riding conditions including known and unknown hazards.

WARRANTY CLAIM PROCEDURE

- If a part is determined to be defective, return said part to your dealership for verification of a defect.
- The dealer will verify whether the part is defective. If the part is determined to be defective by the dealer, the part will be replaced and the amount of the replacement part will be charged to the customers credit card until it is returned to Christini for verification.
- Alternatively, the dealer may opt to send the part in for verification before replacement.
- Upon receipt of the defective part/parts, Christini will determine if the part is eligible for warranty compensation.
- If the part is found to be defective, the customer will be credited the full amount of the replacement part.

This Warranty applies only to the Original Owner (first retail purchaser from motorcycle dealer, distributor, or direct from Christini)

Freight costs and any labor charges for part change overs, assembly, repair, or disassembly are the responsibility of the Original Owner and **this Warranty offers no cash refunds.**

CHRISTINI AWD
421 N. 7th Street
Philadelphia, PA 19123
Phone: (215) 351 9895